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MATHEMATICA
Policy Research, Inc.

**Medicare Quality
Monitoring System
(MQMS) Data
Processing Manual,
Version 1.0**

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C O N T E N T S

Chapter	Page
1 INTRODUCTION	5
2 M1-M3.....	12
3 AMI, HEART FAILURE, AND STROKE.....	74
4 PSI.....	105
5 PQI.....	123
6 HIGH-RISK SURGERIES.....	146
7 DIABETES.....	175
APPENDIX A: COMPREHENSIVE COMPILATION OF MQMS PROGRAMS.....	A-1
APPENDIX B: INPUT DATASETS TO DIABETES PROCESSING.....	B-1
APPENDIX C: PSI MEASURES USED IN MQMS	C-1
APPENDIX D: CROSSWALK BETWEEN AHRQ'S PSI INPUT FILE AND MQMS MEDPAR DATA FORMATS	D-1
APPENDIX E: STRATIFICATION LEVELS FOR THE PSI _TYPE_ VARIABLE.....	E-1
APPENDIX F: CROSSWALK BETWEEN AHRQ'S PSI INPUT FILE AND MQMS MEDPAR DATA FORMATS	F-1
APPENDIX G: STRATIFICATION LEVELS FOR THE PQI _TYPE_ VARIABLE	G-1
APPENDIX H: TABLE SHELLS FOR HIGH-RISK SURGERIES.....	H-1
APPENDIX I: CODES USED TO CREATE THE DIABETES MEASURES.....	I-1

A C K N O W L E D G M E N T S

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CHAPTER I
INTRODUCTION

1. PURPOSE

This manual documents the software created for the Medicare Quality Monitoring System (MQMS). This manual consists of (1) descriptions of methods used to create the software for each measure, (2) flow diagrams showing the sequence of processes and jobs used to create files and tables for a measure or a group of measures and (3) step-by-step descriptions of these processes and jobs. Intended solely for programmers, the manual includes SAS code, JCL, and catalogued procedures as appendixes. Please note that this Version 1.0 of the manual contains dataset names as they exist prior to being moved to Endeavor. Version 2.0 of the manual will contain the updated, Endeavor production dataset names.

2. PROJECT OVERVIEW

a. Background

The MQMS monitors the quality of care delivered to Medicare fee-for-service (FFS) beneficiaries. Developed in the context of growing public concerns over quality of care, patient safety, and hospital performance, it is directed by CMS with assistance from its contractors. Actual MQMS development and production involves a diverse group of CMS staff, including clinical area team leaders (clinicians), epidemiologists, statisticians, and data analysts in the central and regional offices. In developing the system, CMS also consulted with leading experts in other federal agencies—such as the Agency for Health Care Research and Quality, the Centers for Disease Control—and with experts in quality improvement organizations (QIOs) and academia.

b. Purpose

MQMS uses Medicare administrative and survey data to track trends, patterns, and variations in health, disease-specific, and procedure-specific outcomes at the national and state level. CMS uses this information as input to its quality improvement program and initiatives and to its broad, high-level policymaking and program planning in general.

Specifically the MQMS data are to be used for:

- Identifying potential quality problems
- Targeting interventions
- Prioritizing activities and allocating resources
- Focusing on a particular problem
- Raising research questions/hypothesis for investigation

The MQMS data should not be interpreted as:

- Research that links cause and effect
- Evaluation of individual QIO or state performance
- Evaluation of the effectiveness of the QIO program and other CMS quality improvement policies and initiatives

c. Population and Health Issues Examined

The MQMS population consists of Medicare Full-Year, FFS Enrollees with Part A (Hospital Insurance Coverage). MQMS is limited to FFS beneficiaries because of the current lack of encounter data from Medicare managed care plans. The analysis is limited to the national and/or state level, showing trends over time for various demographic and geographic subgroups. These trends are adjusted for variations in the age and sex composition of the population. MQMS monitors the following types of quality measures:

- Mortality, survival rates, readmission rates, length of stay, and cost of hospitalizations for five conditions common in the Medicare population—acute myocardial infarction (AMI), heart failure, stroke
- Mortality and readmission rates following cancer-related and cardiac-related high-risk surgical procedures
- Patient safety
- Preventable hospitalization
- Processes of care and progression of disease in persons with Medicare identified as diabetics.

d. Methods

MQMS products, listed in the following section, are designed as national- and state-level monitoring tools, and not as provider-level monitoring tools. Since the figures are presented at the national and state level, they are adjusted to a standard distribution of age and sex. This age-sex adjustment eliminates state-to-state and year-to-year variations in the age and sex composition of the population as an influence on the MQMS findings.

Beyond the age-sex adjustment, MQMS results are not risk adjusted. This approach assumes that the distribution of health risks is similar from one state population to another, and that the distribution of health risks in the national population is similar from one year to another. CMS continues to assess the validity of this assumption.

MQMS results are based on data from all Medicare FFS beneficiaries and claims, not a sample of such beneficiaries and claims (except in the case of the diabetes measure). The results are therefore not subject to sampling error. MQMS rates are not presented with

confidence intervals or levels of significance, since both are based on properties of sampling error. This approach implies that the FFS population is not interpreted as a sample drawn from a super-population, such as all Medicare beneficiaries or FFS beneficiaries from another time period. MQMS results are, however, subject to measurement error in both the Denominator File and the MedPar database and to modeling error resulting from the age-sex adjustment. CMS continues to investigate the magnitude of these errors.

e. Products

The MQMS products are a series of reports on quality measures, a set of tables on CMS's website, plus the data files at the person and/or discharge, and aggregate level used to generate the reports and the documentation of the methodology. The reports, listed below, are available on the CMS website; the data files are located on the CMS mainframe. To make it easier for analysts to use the data and replicate the analysis, CMS makes SAS programs and data processing documentation available. Access to the data can be granted to CMS analysts on request. Other federal agencies and CMS contractors may obtain the data through a formal data request process.

- Beneficiary Characteristics and Utilization, 1992-2001
- Patient Safety, 2000-2001
- Cancer-Related High-Risk Surgeries, 1992-2001
- Cardiac-Related High-Risk Surgeries, 1992-2001
- Preventable Hospitalizations, 1995-2001
- Acute Myocardial Infarction (AMI), 1992-2001
- Diabetes, 1992-2001
- Heart Failure, 1992-2001
- Stroke, 1992-2001
- Provider-Level Structural Data

3. NAMING CONVENTIONS

This section sets forth the guidelines for naming the MQMS libraries and their contents in both a development and production setting. As such, it covers the naming of libraries, jobs, catalogued procedures, programs, and datasets.

As a general rule, "xx" (note the lowercase) is a year substitute in the documentation and SAS code comments for program names, internal SAS file names and mainframe file location names (e.g., D#MSQ.@MSQ0000.SAS.YxxM1001.DENOMAxx would be Y99M1001.DENOMA99 for 1999). However, there are some exceptions to this rule, and they will be clearly noted in the documentation that follows with "XX" (note the uppercase), as well as a special note. For production JCL, catalogues procedures, and SAS programs for High-Risk Surgeries, we use the naming convention specified in the Standards Manual. Namely, "y" represents the years 1992-2001, and "Y" represents a program that runs for all years as-is. For input and output datasets, however, we specify a range of years using "xx" (again, note the lowercase). Finally, for the AMI, Heart Failure, and Stroke measures, the

High Level Qualifier: Production - P#MSQ
 Test - D#MSO

D#MSQ.@MSQ01.DOCLIB Development version of online documentation

D#MSQ.@MSQ01.JCLTEST Testing version of execution JCL (lrecl=80)

PROD.JCL.LIB Final production version of execution JCL

D#MSQ.@MSQ01.JOBLIB	Development version of job output (lrecl=130)
VIEW Facility	Final production version of job output

D#MSQ.@MSQ01.PGMLIB Development version of MQMS SAS programs
(lrecl=80)

PROD.SAS.LIB Final production version of MQMS SAS programs

D#MSQ.@MSQ01.PROCLIB Development version of catalogued procedures
(lrecl=80)

PROD.PROC.LIB Final production version of catalogued procedures

D#MSQ.@MSQ01.PARMLIB Development version of input parameter cards
(lrecl=80)

PROD.PARM.LIB Final production version of input parameter cards

All production job names begin with the MQMS system identifier, MSQ. The fourth position is a constant, #, which denotes the data security level. The final four positions remain for unique identification of year, measure type and sequence in measure processing.

Job name format is MSQ#YTSS where:

$$Y = \begin{matrix} 0-9 \text{ for } 1990-1999 \end{matrix}$$

A-N for 2000-2013 (this convention is used at CMS by DESY jobs)

Y – as a constant denotes all years in analysis are processed

T = Type of measure code
 A – Initial Input Processing (Global)
 C – Characteristics (2002-2003 Task 004)
 D – Diabetes (2002-2003 Task 004)
 U – Utilization, Outcomes (2002-2003 Task 004)
 S – Patient Safety Indicators Measures (2002-2003 Task 005)
 H – High Risk Surgeries Measures (2002-2003 Task 006)
 Q – Patient Quality Indicators Measures (2002-2003 Task 007)
 R – Public Reporting by Provider (2002-2003 Task 009)

SS = Sequence starting at 00 for copy of primary input datasets and numbering in increments of 10.

c. Catalogued Procedure Names

Catalogued procedures called from production JCL follow the form of the calling JCL member name (i.e., b. Job Naming Conventions) with one exception. HDC guidelines mandate the letter P as the final character in the procedure name. Removing the # from the job name makes this easily possible. The resulting procedure name follows the format MSQYTSSP. All components are as above, remembering the P is HDC standard to denote a catalogued PROC. PROCs developed for testing purposes only, and not intended to be promoted to a production library, are placed in the library D#MSQ.@MSQ01.PROCLIB with a final character D. They are executed by JCL held in the library D#MSQ.@MSQ01.JCLTEST.

d. Program Names

Program names correspond to the names of the calling JCL and associated catalogued procedure. Following the patterns established above, program name format is MSQYTSSn where:

Y = 0-9 for 1990-1999

 A-N for 2000-2013 (this convention is used at CMS by DESY jobs)

 Y – as a constant denotes all years in analysis are processed

T = Type of measure code
 A – Initial Input Processing (Global)
 C – Characteristics (2002-2003 Task 004)
 D – Diabetes (2002-2003 Task 004)
 U – Utilization, Outcomes (2002-2003 Task 004)
 S – Patient Safety Indicators Measures (2002-2003 Task 005)
 H – High Risk Surgeries Measures (2002-2003 Task 006)
 Q – Patient Quality Indicators Measures (2002-2003 Task 007)
 R – Public Reporting by Provider (2002-2003 Task 009)

SS = Sequence starting at 00 for copy of primary input datasets and numbering in increments of 10.

n = Program number within the catalogued procedure, increment by 2, starting with 2.

e. Dataset Names

All MQMS datasets created bear a name in compliance with CMS data center naming conventions. As outlined in the Data Center User's Guide, non-VSAM DASD and tape files dataset names are formatted as follows:

Format: xxx.@aaannnn.zzzzzzzz.zzzzzzzz (maximum 44 characters)
 Where: xxx = Application System Code
 @aaannnn = Accounting Code
 zzzzzzzz = Descriptive information

The third node matches that of the program that created the dataset. The fourth node is the same as the internal SAS dataset name. (Note to programmers: Pay close attention in selecting internal SAS dataset names since year specific indicators may be required to differentiate files.) The majority of MQMS system files are SAS, therefore only flat files have an inserted qualifier node '. FLAT .' before the final node.

Using the conventions outlined above, the following might result:

Job:	MSQ#1H10			
JS010 calls PROC:	MSQ1H10P			
PS010 calls program:	MSQ1H102			
Program	MSQ1H102	creates	output	files:
			P#MSQ.@MSQ01.MSQ1H102.VL91PX01	
			P#MSQ.@MSQ01.MSQ1H102.VL91PX02	
			P#MSQ.@MSQ01.MSQ1H102.VL91PX03	
			P#MSQ.@MSQ01.MSQ1H102.VL91PX04	
			P#MSQ.@MSQ01.MSQ1H102.VL91PX05	

It is important to note that the input datasets for the Diabetes measure do not follow the rules governing the naming of datasets. Because the input data is pulled from DESY, the datasets are named in accordance with DESY rules. An example is the following (please see Appendix B for a complete list of the Diabetes input datasets):

P#DSY.@AAA2049.WF17.@----- .R0016065.OUT

CHAPTER II

METHODS, FLOWCHARTS, AND

SPECIFICATIONS FOR M1 - M3¹

¹ Please see the top of page 12 for a description of M1, M2, and M3.

PART I: METHODS

1. DESCRIPTION OF THE MEASURE

- M1 - Distribution of Medicare Enrollees by Age Group, Sex, Race, Medicare Eligibility Status, Medicaid Enrollment Status, and Geographic Areas for Calendar Years 1992-2001
- M2 - Frequency and Rate of Hospital Discharges per 1,000 Full-Year Medicare FFS Enrollees from Short-Stay Hospitals by the HCQIP Surveillance Diagnosis Groups by Age Group, Sex, Race, Medicare Eligibility, Medicaid Enrollment Status, and Geographic Region, Calendar Years 1992-2001
- M3 - Frequency and Rate of Hospital Discharges per 1,000 Full-Year Medicare FFS Enrollees from Short-Stay Hospitals by the HCQIP Surveillance Procedure Groups by Age Group, Sex, Race, Medicare Eligibility, Medicaid Enrollment Status, and Geographic Region, Calendar Years 1992-2001

2. CMS DATA SOURCES

- 100% Denominator File from Decision Support Access Facility (DSAF) for each year, 1992-2001. The DSAF provides access to the flat 1992-2001 Denominator Files.
- 100% MedPAR File from Decision Support Access Facility (DSAF) for each year, 1992-2001. Provides access to the flat 1992-2001 MedPAR Files.

3. INCLUSION CRITERIA

- Discharge is a short-stay acute care hospital claim.
- Discharge record is not a duplicate entry in the MedPAR file.
- M2 and M3 - Beneficiary belongs to the MQMS M13/M14 Base Analytic Denominator File.
- M2 and M3 - Discharges in the HCQIP clinical priority areas identified through ICD-9-CM diagnosis and procedure codes.

4. EXCLUSION CRITERIA

- Claimants residing outside of the United States, except claimants residing in Puerto Rico, Guam, and the Virgin Islands. Residents of Guam are included with Hawaii residents.
- Claimants with invalid values for date of birth, state code, sex, race, and Medicare status code.

5. KEY VARIABLES

- FFS Flag: A dichotomous variable that identifies beneficiaries enrolled in Medicare FFS during July of each calendar year.
 - 1 = Enrolled in FFS during July of calendar year
 - 0 = Not enrolled in FFS during July of calendar year
- Part A Flag: A dichotomous variable that identifies beneficiaries enrolled in Medicare Part A during July of each calendar year.
 - 1 = Enrolled in Part A during July of calendar year
 - 0 = Not enrolled in Part A during July of calendar year
- July Dual Flag: A dichotomous variable that identifies beneficiaries that are dually enrolled in Medicare Part A and Medicaid during July of each calendar year, defined as the member being enrolled in Medicare Part A and with Medicaid buy-in during July of the calendar year.
 - 1 = Enrolled in Medicare Part A and Medicaid on July 1 of calendar year
 - 0 = Not dually enrolled in Medicare Part A and Medicaid during July of calendar year
- M1-4: A dichotomous variable that identifies Medicare beneficiaries that meet M1-4 MQMS inclusion criteria (enrolled in FFS Part A for the full 12 months or full number of months alive during the analytic year) and none of the MQMS exclusion criteria. This is the base MQMS study population and from which special populations may be drawn.
 - 1 = Beneficiary eligible for M1-4 Cohort and inclusion in the MQMS outcome measures
 - 0 = Beneficiary not eligible for M1-4 Cohort or the MQMS outcome measures
- M1-3: A dichotomous variable that identifies Medicare beneficiaries that meet M1-3 inclusion criteria (enrolled in Part A FFS as of July 1st of the analytic year) and none of the MQMS exclusion criteria.
 - 1 = Beneficiary eligible for M1-3 Cohort
 - 0 = Beneficiary not eligible for M1-3 Cohort
- M7: A dichotomous variable that identifies a subset of MQMS Medicare beneficiaries that are eligible for inclusion in the diabetes cohort and diabetes process and outcomes measure, M7. In addition to the MQMS M1-4 inclusion criteria, these beneficiaries must almost have been enrolled in Medicare Part B for the entire calendar year. Beneficiaries who die during the calendar year are excluded from the M7 cohort.
 - 1 = Beneficiary eligible for Diabetes Outcome Measure M7
 - 0 = Beneficiary not eligible for Diabetes Outcome Measure M7

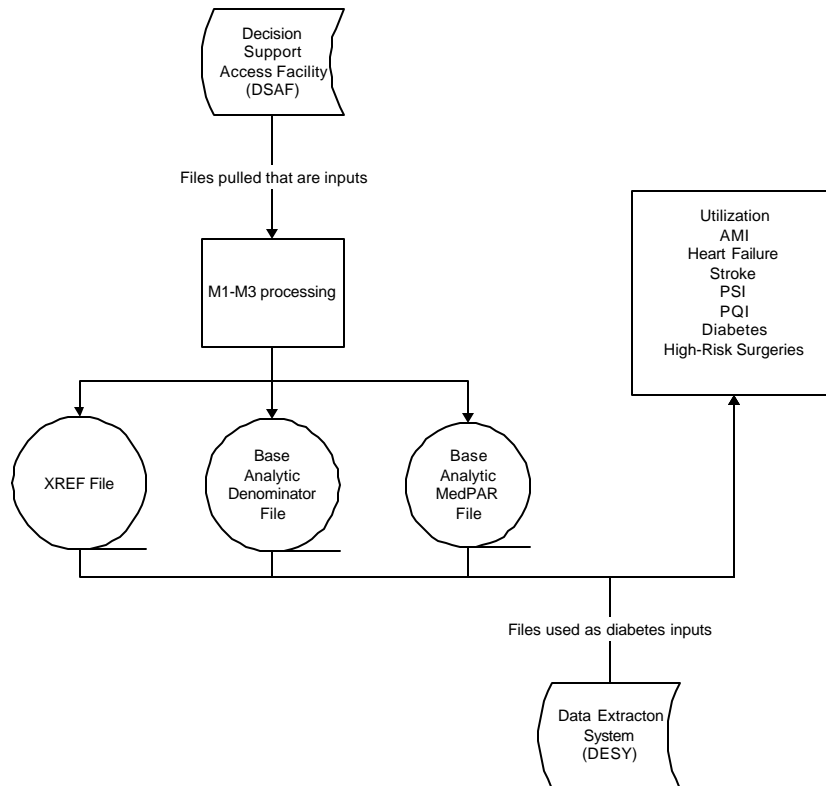
- Year: Calendar year of the analytic file.
- Urban/Rural: A dichotomous variable defining beneficiary county of residence as an urban or rural location. All counties residing within a Metropolitan Statistical Area (MSA) are designated as urban areas.
 - 1 = Urban Area
 - 0 = Rural Area
- Death Flag: A dichotomous variable indicating beneficiaries who died during the calendar year.
 - 1 = Died in calendar year
 - 0 = Alive throughout calendar year
- State: Beneficiary state of residence as of March 31st of the year following the reference year.
- Dual Flag: A dichotomous variable that identifies beneficiaries that are dually enrolled in Medicare and Medicaid at least one month during the calendar year, defined as the member being enrolled in Medicare Part A and with Medicaid buy-in at least one month during the calendar year.
 - 1 = Medicare and Medicaid dual enrollment
 - 0 = Not enrolled in Medicaid
- Medicare Status: Original reason for Medicare eligibility
 - 1 = Aged without ESRD
 - 2 = Aged with ESRD
 - 3 = Disabled without ESRD
 - 4 = Disabled with ESRD
 - 5 = ESRD only
 - Other values assigned a value of "0"
- Age: Beneficiary age is calculated as of July 1 for each calendar year.
- Age Group: Nine age groupings based on age.
- Race of Beneficiary
 - 1 = White
 - 2 = African American
 - 3 = Other (Asian, Hispanic, North American Native, Other)
 - 0 = Unknown
 - Other values assigned a value of "X"
- Census Division: Beneficiary Census Division of residence as of March 31st of the year following the reference year.
 - 0 = Puerto Rico and Virgin Islands

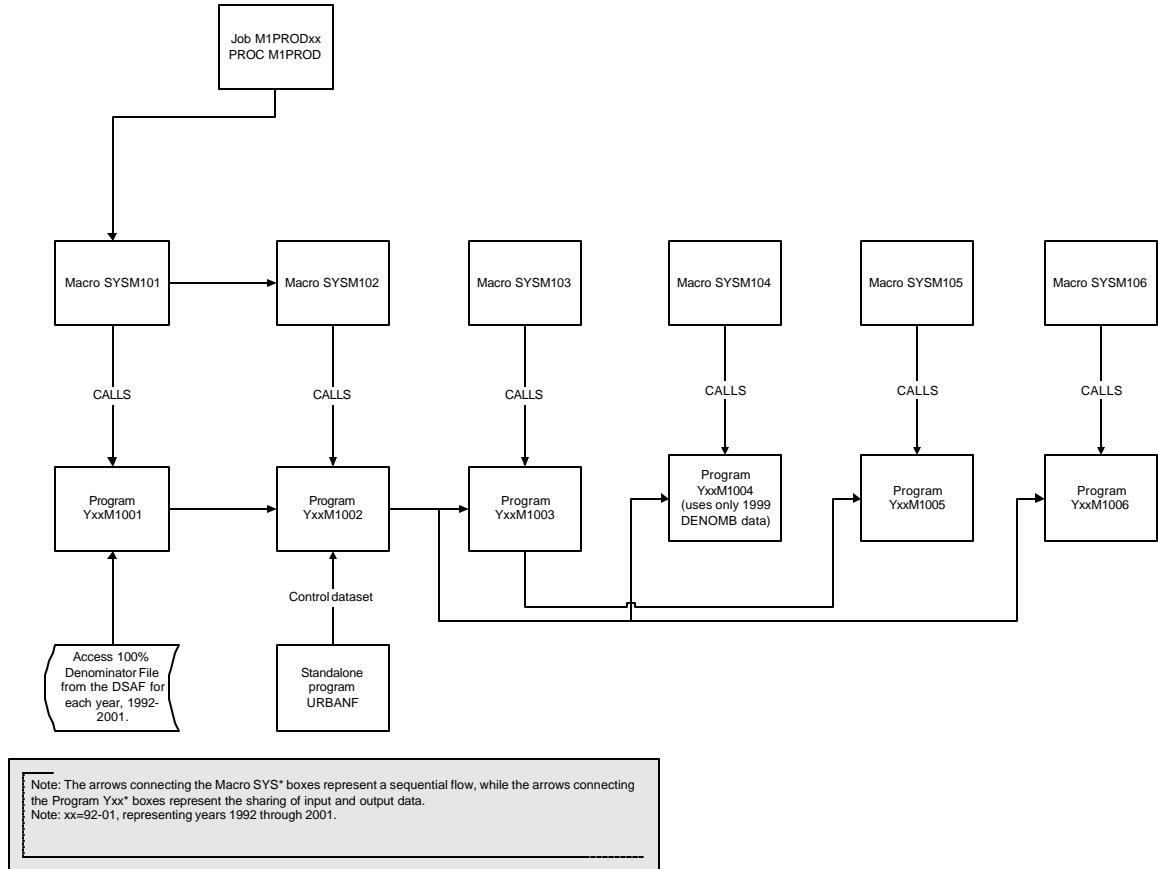
- 1 = New England
- 2 = Middle Atlantic
- 3 = East North Central
- 4 = West North Central
- 5 = South Atlantic
- 6 = East South Central
- 7 = West South Central
- 8 = Mountain
- 9 = Pacific

- Census Region: Beneficiary Census Region of residence as of March 31st of the year following the reference year.
 - 0 = Puerto Rico and Virgin Islands
 - 1 = Northeast
 - 2 = Midwest
 - 3 = South
 - 4 = West
- Beneficiary state of residence as of March 31st of the year following the reference year. Residents of Guam are reported with residents of Hawaii. Non-U.S. states or territories assigned a value of "NO".

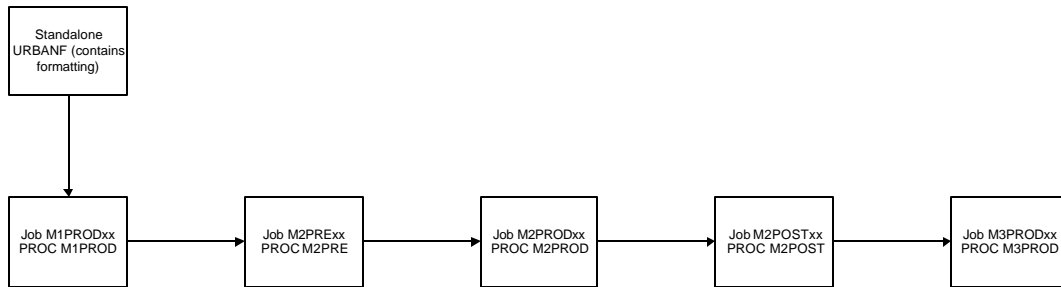
PART II: FLOWCHARTS

Simplified MQMS Flow Diagram

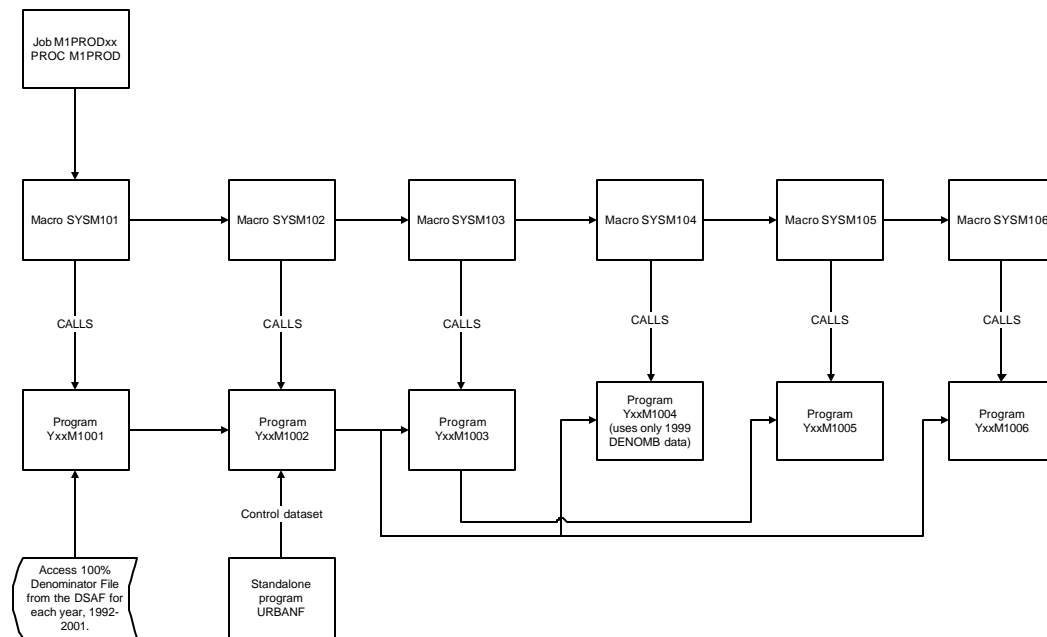




M1-M3 Job Overview

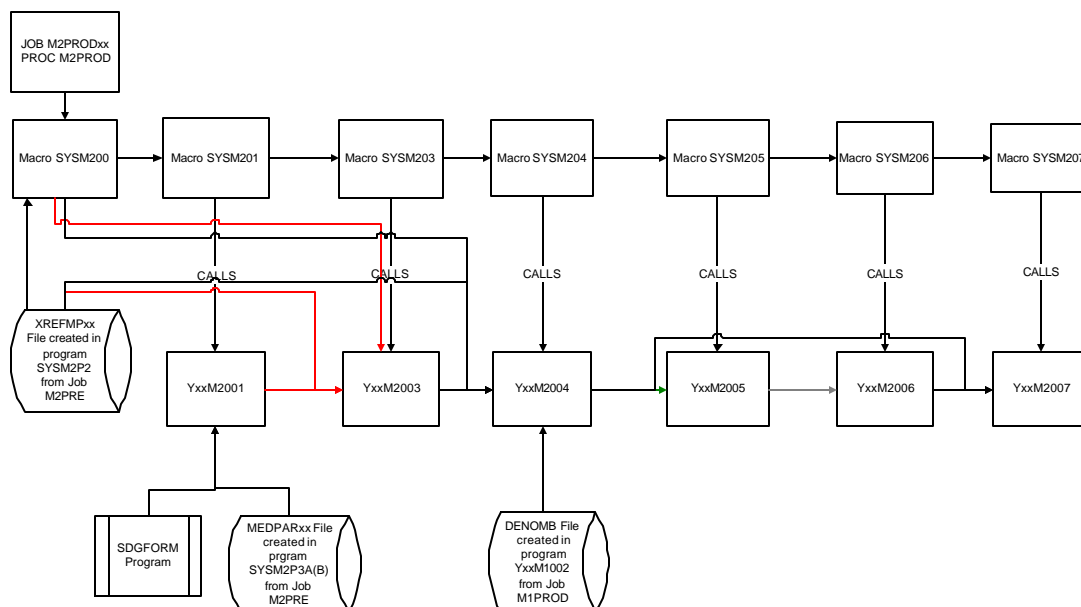


M1PRODxx

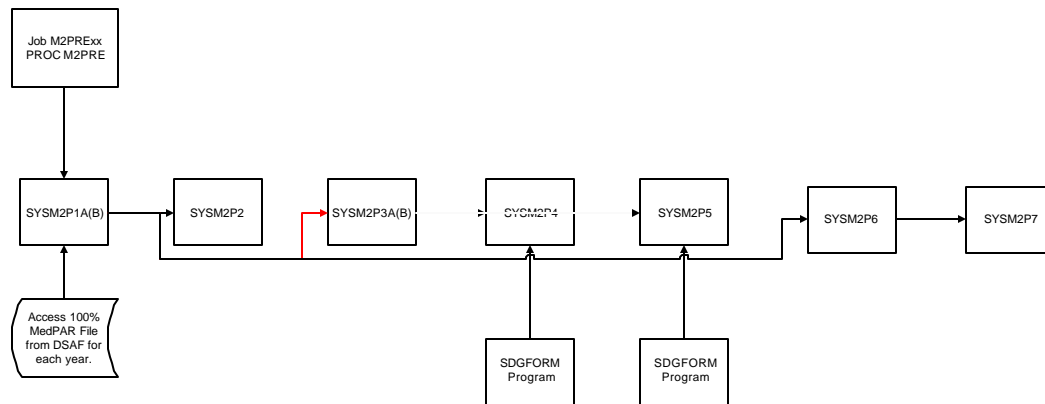


Note: The arrows connecting the Macro SYS* boxes represent a sequential flow, while the arrows connecting the Program Yxx* boxes represent the sharing of input and output data.
Note: xx=92-01, representing years 1992 through 2001.

M2PRODxx

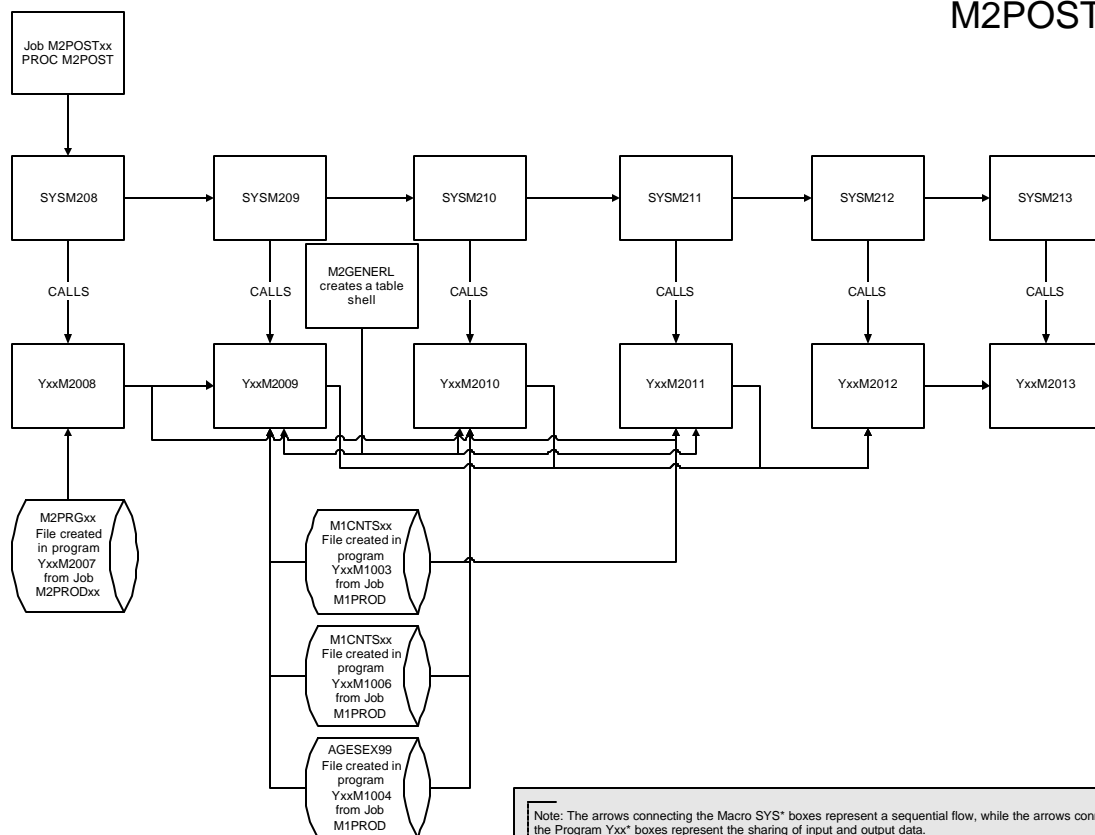


Note: The arrows connecting the Macro SYS* boxes represent a sequential flow, while the arrows connecting the Program Yxx* boxes represent the sharing of input and output data.
 Note: xx=92-01, representing years 1992 through 2001.



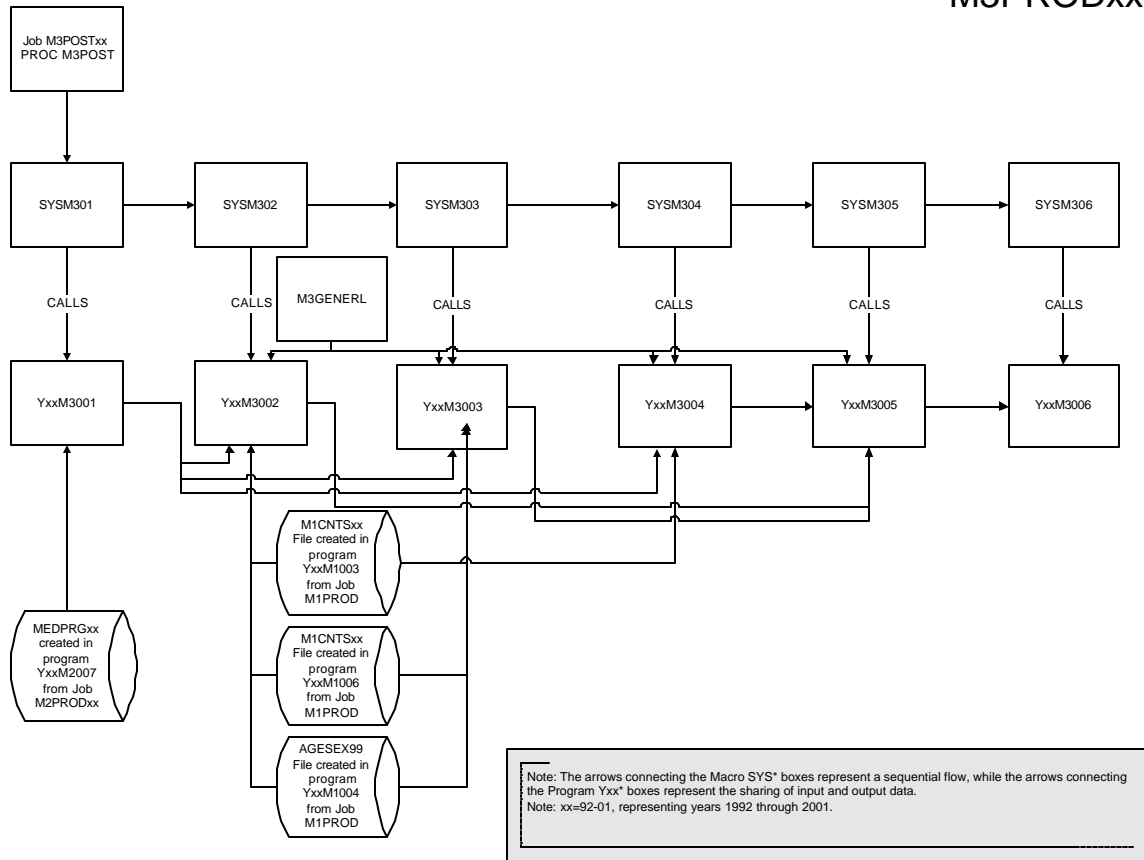
Note: The arrows connecting the Macro SYS* boxes represent a sequential flow, while the arrows connecting the Program Yxx* boxes represent the sharing of input and output data.
Note: xx=92-01, representing years 1992 through 2001.

M2POSTxx



Note: The arrows connecting the Macro SYS* boxes represent a sequential flow, while the arrows connecting the Program Yxx* boxes represent the sharing of input and output data.
 Note: xx=92-01, representing years 1992 through 2001.

M3PRODxx



PART III: DATA PROCESSING

Description of Processing for M1 - Distribution of Medicare Enrollees by Age Group, Sex, Race, Medicare Eligibility Status, Medicaid Enrollment Status, and Geographic Areas for Calendar Years 1992-2001.

Please note that the catalogued procedures and SAS programs for the years 1992-2000 are stored in the D#MSQ.@MSQ00M1.PGMLIB99, while production JCL, catalogued procedures, and SAS programs for the year 2001 are stored in D#MSQ.@MSQ00M1.PGMLIB01. We have listed only the D#MSQ.@MSQ00M1.PGMLIB99 locations below. However, in the cases where 2001 input or output datasets are named differently than their 1992-2000 counterparts, we have explicitly listed that name. In addition, the JES logs, SAS logs, and SAS lists for the programs are found in D#MSQ.@MSQ00M1.JOBLIBXX.

1. PROGRAM: D#MSQ.@MSQ00M1.PGMLIB99(URBANF)

Input Files: D#MSQ.@MSQ00.FLAT.TI36LIB1.URBANF
Output Files: D#MSQ.@MSQ0000.SAS.URBANF.URBANMSA

Purpose: This is a standalone program that creates a control dataset used in a later program (YXXM1002) to develop a dichotomous urban/rural variable for a beneficiary's place of residence. The following assignment criteria for "urban" or "rural" is used: (1) if the MSA code exists, then that county's status is urban; (2) if it doesn't exist, then the status is rural; and (3) non-matches are assigned to rural status. The 1999 MSA code for a given SSA state and county are selected and used for all years. This program reads in the MSABEA file off the CMS web site and creates a SAS file used as a control dataset for an urban/rural informat.

Program Steps:

Step 1: Read in the MSABEA flat file and transform it into a SAS control dataset (i.e., a SAS dataset that acts as a format). These informats and formats allow for the recoding of values to other values based on predetermined assignment criteria; in this case, urban or rural.

Step 2: Anticipating that there will be non-matches during the merge of the control dataset to the Denominator File, we allow for non-matches to be given the value of "X". This makes it possible to get counts of non-matches.

Step 3: Run a PROC CONTENTS on the 1999 Urban MSABEA Control Dataset for the urban informat. Execute a data dump of 30 observations (the dump's output is found in output location defined above).

Step 4: Print out the format as an actual control dataset for the urban/rural character informat.

2. PROGRAM: ACCESS 100% DSAF FOR DENOMINATOR FILE DATA

Output Files:

```

TI03.@MSQ0000.D#MSQ.DENOM92
TI03.@MSQ0000.D#MSQ.DENOM93
TI03.@MSQ0000.D#MSQ.DENOM94
TI03.@MSQ0000.D#MSQ.DENOM95
TI03.@MSQ0000.D#MSQ.DENOM96
TI03.@MSQ0000.D#MSQ.DENOM97
TI03.@MSQ0000.D#MSQ.DENOM98
TI03.@MSQ0000.D#MSQ.DENOM99
TI03.@MSQ0000.MSQ2000.DENOM00
TI02.@MSQ0000.MSQDEN01.DENOM01

```

Purpose: Access 100% Denominator File from Decision Support Access Facility (DSAF) for each year, 1992-2001. The DSAF provides access to the flat 1992-2001 Denominator Files, as illustrated in the screen shots that follow.

Program Steps:

Step 1:

```

*****
D E C I S I O N   S U P P O R T   A C C E S S   F A C I L I T Y
                M A I N   M E N U
*****

1.  EPIDEMIOLOGICAL DATA                (FTAPE NOT AVAILABLE)
2.  HISTORICAL DATA
3.  STANDARD ANALYTICAL DATA            (VERSION H DATA)
4.  NCH DATA - STATE SPECIFIC/RETIRED   (VERSION H DATA)
5.  NCH DATA - 100% NATIONAL            (VERSION H OR I DATA)
6.  PUBLIC USE FILES
7.  PART B EXTRACT SUMMARY SYSTEM (BESS)
8.  DATA PREPARATION
9.  SUMMARY DATA
10. RECORD SPECIFICATION FACILITY

E.  EXIT

PLEASE ENTER SELECTION ==>

```

Step 2:

```

*****
M A T C H I N G       T O       D E N O M I N A T O R   D A T A
*****

1.  FINDER MATCH TO DENOMINATOR RECORDS

```

- 2. SELECT DENOMINATOR RECORDS BY GEOGRAPHIC DATA FIELDS
- 3. SELECT DENOMINATOR RECORDS BY PERCENT
- R. RETURN TO ENROLLMENT MENU

PLEASE ENTER SELECTION ==> 3

SELECT DENOMINATOR RECORDS BY PERCENT:

- 1. 1% (RECORDS WITH 95 IN POS. 8-9 OF HIC)
- 2. 5% (RECORDS WITH 05, 20, 45, 70 OR 95 IN POS. 8-9 OF HIC)
- 3. 20% (RECORDS WITH 0 OR 5 IN POS. 9 OF HIC)
- 4. 100% (ENTIRE FILE FOR DENOM YEAR(S) SELECTED)

- R. RETURN TO PREVIOUS MENU
- PLEASE ENTER SELECTION ==> 4

Step 3:

L2: NDENOM90

PLEASE CHECK INFORMATION ENTERED
(YOU MAY WISH TO PRINT SCREEN FOR FUTURE USE)

- 1 SELECT DENOMINATOR RECORDS BY PERCENTAGE
- 2 PERCENT SELECTED: ENTIRE FILE FOR DENOMINATOR YEAR(S) SELECTED
- 3 INPUT FILE SELECTION: DENOMINATOR YEAR 1: 1992
 - DENOMINATOR YEAR 2: 1993
 - DENOMINATOR YEAR 3: 1994
 - DENOMINATOR YEAR 4: 1995
- 4 ACCOUNT: MSQ00000000
- 5 STUDY NAME: D#MSQ
- 6 OUTPUT CREATION DATE: 010301
- 7 FOREIGN FILE STORAGE: (TI03 ONLY, NO FOREIGN COPY)
- OUTPUT FILE NAMES: TI03.@MSQ0000.D#MSQ.DENOM92.#010301
 - TI03.@MSQ0000.D#MSQ.DENOM93.#010301
 - TI03.@MSQ0000.D#MSQ.DENOM94.#010301
 - TI03.@MSQ0000.D#MSQ.DENOM95.#010301

TYPE "C" IF INFORMATION IS CORRECT. TYPE "A" TO RE-ENTER
ALL DATA SHOWN.

TYPE "R" TO RETURN TO PREVIOUS SCREEN. TYPE "E" TO EXIT TO
MAIN MENU.

OR, TYPE THE NUMBER OF THE ITEM WHICH YOU WANT TO RE-
ENTER

("1" THRU "7", ABOVE) ==> C

3. PRODUCTION JCL: D#MSQ.@MSQ00M1.PGMLIBxx(M1PRODxx)

Purpose: This job executes the cataloged procedure M1PROD for a specified year (e.g., M1PROD92 for 1992). To run this job for other years, simply define the year of analysis in the YEAR parameter (2 digit year). The year parameter is passed on to M1PROD (the called cataloged procedure), which then passes it on to all the subsequent macro and SAS programs. All programs from this point forward are run based on the execution of this production JCL. Therefore, all output generated from subsequent programs will all be in one file -- D#MSQ.@MSQ00M1.JOBLIBXX(M1PRODXX).

3.1 Cataloged procedure: D#MSQ.@MSQ00M1.PGMLIB99(M1PROD)

Purpose: This is a cataloged procedure with six steps. Each of the six steps executes a SAS macro call (named SYSM101 through SYSM106), which in turn execute six corresponding macro programs (YXXM1001 through YXXM1006). The YEAR parameter defined in the production JCL M1PRODXX is passed onto this program, defining the year to which all subsequent programs will be executed. These programs are steps in creating the Base Analytic Denominator File, the count files for the cohorts, age/sex adjustment count files, and summary tables for the cohorts.

3.1.1 Macro Program: D#MSQ.@MSQ00M1.PGMLIB99(SYSM101)

Input Files:	TI03.@MSQ0000.D#MSQ.DENOMxx.#010301 TI03.@MSQ0000.MSQ2000.DENOM00.#10051 TI02.@MSQ0000.MSQDEN01.DENOM01.#082302
Output Files:	D#MSQ.@MSQ0000.SAS.YXXM1001.DENOMAXX

Purpose: Macro call to program YXXM1001. This macro passes the YEAR parameter (as defined in M1PRODxx) on to YXXM1001.

3.1.1.1 Called Program: D#MSQ.@MSQ00M1.PGMLIB99(YXXM1001)

Purpose: This program identifies exact duplicate observations, reads in the raw Denominator File data for the specified year (which is passed to it from SYSM101 based on the YEAR parameter defined in the production JCL M1PRODXX), deletes exact duplicates from the Denominator File, and provides preliminary statistics. **Please note that the “XX” in the program title does not represent an abbreviation for all years. The program is actually named YXXM1001. This is true for all called programs listed for M1.**

Program Steps:

Step 1: Create a temporary file with the variable HICNO. This temporary file holds only the variables needed for the identification of duplicates, which is more efficient than sorting through the entire Denominator File. This temporary file is sorted by HICNO.

Step 2: Identify duplicates from the sorted temporary file and output them using a PROC PRINT.

Step 3: Save the HICNO of the exact duplicates in order to identify them in the Denominator File.

Step 4: Read in the Denominator File and assign the records a unique observation number (YXXDOBS). This number is used to track beneficiary observations from the Denominator File to the final MQMS Base Analytic Denominator File, and to avoid CPU-intensive sorting during computer processing of files.

Step 5: Exclude any observations identified as exact HICNO duplicates.

Step 6: Create labels for the variables on the Denominator File and provide a PROC CONTENTS and data dump of 20 observations for the new version of the file.

Step 7: Provide preliminary statistics (frequencies) for quality control purposes on the year of a beneficiary's date of birth, the gender, race/ethnicity, and Medicare status code of a beneficiary, and the date of a beneficiary's death - coded as MM-YYYY (e.g., 03-2000 for March 2000).

3.1.2 Macro Program: D#MSQ.@MSQ00M1.PGMLIB99(SYSM102)

Input Files:	D#MSQ.@MSQ0000.SAS.YXXM1001.DENOMAXX D#MSQ.@MSQ0000.SAS.URBANF.URBANMSA
Output Files:	D#MSQ.@MSQ0000.SAS.YXXM1002.DENOMBXX D#MSQ.@MSQ0000.SAS.YXXM1002.DENEXBXX D#MSQ.@MSQ0000.SAS.YXXM1002.DENRURXX

Purpose: Macro call to program YXXM1002. This macro passes the YEAR parameter (as defined in M1PRODXX) on to YXXM1002.

3.1.2.1 Called Program: D#MSQ.@MSQ00M1.PGMLIB99(YXXM1002)

Purpose: This program creates the Base Analytic Denominator File that contains all enrollment and socio-demographic information on beneficiaries eligible for any of the three cohorts. Key variables are defined, urban/rural assignment from the URBANF file created in the URBANF program is merged on, beneficiaries not eligible for the analyses are excluded, and the cohorts for M1-3, M1-4 and M7 are defined.

Program Steps:

Step 1: Create formats and informats for the key variables that allow for the later exclusion of values not appropriate for this system. Below are definitions of key analytic variables in the order they appear in the YXXM1002 program, that are used to identify Medicare beneficiaries eligible for the Medicare Quality Monitoring System and to

develop and report MQMS process and outcome measures. All key variables are housed in a permanent analytic file, entitled MQMS Base Analytic Denominator File, which is constructed on a calendar year basis.

Step 2: Read in the URBANF file as a format to be used later to assign urban/rural status.

Step 3: Define files to write data to, and define what variables to keep in each of the files. The defined files are as follows:

- a. The next version of the DENOMA file (DENOMBYY).
- b. The file to house the observation numbers and the variable identifying the reasons for exclusion for those beneficiaries that are excluded (DENEXBYY).
- c. The file to identify non-matches for the urban/rural assignment by their observation number (DENRURYY).

Step 4: Count the months of Part A, Part B, FFS, and dual Medicaid enrollment.

- a. Set in arrays for the monthly buy-in and HMO variables. These are 12 digit variables that contain one entitlement/buy-in or HMO indicator for each month of the calendar year (e.g., the first digit denotes enrollment in January).
- b. Create the macro variable `xx` for use in age calculation to toggle between years beginning with 19 (e.g., 1999) and years beginning with 20 (e.g., year 2000). The macros were originally written to accommodate the years 1992-1999. So, in general, when a year value was used in a calculation, 19 was assumed to be the first two digits. However, when processing was moved to data for the year 2000, this had to be changed, too. Otherwise, 1900 would have been used in some calculations rather than the year 2000.
- c. This step prepares for sub-step (d) by identifying a window end-point determining the number of months run through to sum up the number of months of Part A, Part B, FFS and dual Medicaid enrollment. A variable (`ENZ`) sets the number of months of enrollment data to examine to 12 unless the beneficiary died during the year of analysis of death, at which point `ENZ` equals the number of months the beneficiary was alive during the year of analysis.
- d. Using `ENZ` to define the number of months to examine enrollment, sums months of Part A, Part B, FFS, and dual Medicaid enrollment. For example, if a beneficiary was enrolled in Part A for the full analytic year, the sum for that beneficiary's months of Part A enrollment would equal 12.

Step 5: Perform major variable assignments.

Step 6: Create the Exclusion Indicator Variable (`EXTP`), a three-digit variable that reflects the reason for exclusion from the MQMS Base Denominator File. Beneficiaries who meet the

enrollment and eligibility inclusion criteria are excluded from the M1-3 and M1-4 MQMS study populations and the M7 Diabetes study population if they meet any of the following exclusion criteria listed below. The following are the Statistical Supplements for exclusion criteria specific to M1-1 and M1-2:

- a. Beneficiaries residing outside of the United States as of March 31st of the year following the reference year, except beneficiaries residing in Puerto Rico, Guam, and the Virgin Islands and missing or non-documented values for beneficiary state (STATE = NO).
- b. Invalid (negative) or missing date of birth (FAGE = X).
- c. Missing or non-documented values for beneficiary sex.
- d. Missing or non-documented values for Medicare status (MDST = 0).
- e. Date of death prior to the measurement year.
- f. Missing or non-documented values for Beneficiary Race Code (RACE = X)
- g. Not a member of M1-3, M1-4, or M7.

Step 7: Exclude beneficiaries that meet the exclusion criteria, assign beneficiaries with a non-match to the urban/rural file to rural status, and write out non-excluded beneficiaries to the DENOMBY file. If excluded, then put the observation number and exclusion code in DENEXBY file. If not excluded, and a non-match to the URBANF file (URBAN = x), then copy the observation number to the DENRURY file and non-matches are given the rural designation. All non-exclusions go to DENOMBY.

Step 8: Create labels for major analytic variables.

Step 9: Perform a frequency on the exclusion code (EXTP variable) and a PROC CONTENTS and PROC PRINT on the DENEXBY, DENOMBY, and DENRURY files. The three-digit EXTP variable translates into a seven digit binary number, of which each digit identifies the reason for exclusion and is read left to right.

- 1st digit = 1, if beneficiary did not get selected for M1-3, M1-4 or M7 Cohorts
- 2nd digit = 1, if beneficiary had an invalid or missing race code
- 3rd digit = 1, if beneficiary had an invalid date of death
- 4th digit = 1, if beneficiary had an invalid Medicare status code
- 5th digit = 1, if beneficiary had an invalid or missing sex code
- 6th digit = 1, if beneficiary had an invalid or missing date of birth
- 7th digit = 1, if beneficiary had an invalid State Code

3.1.3 Macro Program: D#MSQ.@MSQ00M1.PGMLIB99(SYSM103)

Input Files: D#MSQ.@MSQ0000.SAS.YXXM1002.DENOMBXX
 Output Files: D#MSQ.@MSQ0000.SAS.YXXM1003.M1CNTSXX

Purpose: Macro call to the program YXXM1003. This macro passes the YEAR parameter (as defined in M1PRODXX) on to YXXM1003.

3.1.3.1 Called Program: D#MSQ.@MSQ00M1.PGMLIB99(YXXM1003)

Purpose: Creates the annual MQMS M1-3 and M1-4 Enrollment Count Files from the MQMS Base Analytic Denominator Files, in total and by each subgroup category. These counts are for reporting purposes.

Program Steps:

Step 1: Prepare the cohorts to create the counts. Set up do loops for the 2 cohorts with the first loop applying to M1-3 and the second to M1-4. The do loop runs through the first 4 steps of this program for M1-3 before running for M1-4. Set the July indicator for the M1-3 cohort and set it to missing for the M1-4 cohort since it is not applicable. Set the 9 sub-groupings for the counts (census division, census region, dual eligibility -July dual flag for M1-3 and dual flag for M1-4, age group, Medicare status, race, sex, state, and urban/rural status).

Step 2: Output frequencies for each of the 9 subgroups to 9 temporary files (TEMPORARY1 - TEMPORARY9) corresponding to the 9 subgroups (e.g., TEMPORARY1 has the frequency for census division) for each of the 2 cohorts. Perform a quality check for missing values in any of the subgroups - there should be no missing values, but this quality adds an additional check to make sure previous programs coded values correctly. If there are missing values, the log of the program will state that there is a problem with missing values. Missing values are deleted so the program will continue. The TEMPORARY7 output for 1999 looks like the following:

Y99SEX	COUNT
0	n
1	n

Step 3: Prepare the 9 temporary files to be alphabetically consolidated into one file by putting the first three letters of the variable name in front of the value, creating a generic variable heading with the analytic year in the title, and creating a heading for the counts indicating the year of analysis and the cohort. The revised TEMPORARY7 output for 1999 looks like the following:

Y99VARS	Y99CTM13
SEX0	n
SEX1	n

Create a 10th temporary file that equals the total number of people in the cohort. Use the urban frequency to create the total. At this point, there are still 10 separate temporary files.

Step 4: Concatenate the 10 temporary files alphabetically to create TEMPORARYA1 (for M1-3 cohort) and then delete the TEMPORARY1-10 files. This is the end of do loop 1. The program now goes back and runs the same steps for M1-4, ultimately creating TEMPORARYA2 for the M1-4 cohort.

Step 5: Merge the 2 cohort files together. As a precaution, if either of the cohorts has no observations for any of the values in a subgroup, it is set to 0 (e.g., no beneficiaries of female gender in M1-4). The final subgroup count file looks like:

Y99VARS	Y99CTM13	Y99CTM14
SEX0	n	n
SEX1	n	n

Step 6: Perform a PROC CONTENTS and PROC PRINT on the analytic count file.

3.1.4 Macro Program: D#MSQ.@MSQ00M1.PGMLIB99(SYSM104)

Input Files:	D#MSQ.@MSQ0000.SAS.YXXM1002.DENOMB99
Output Files:	D#MSQ.@MSQ0000.SAS.Y99M1004.AGESEX99

Purpose: Macro call to the program YXXM1004. This macro passes the YEAR parameter (as defined in M1PRODXX) on to YXXM1004.

3.1.4.1 Called Program: D#MSQ.@MSQ00M1.PGMLIB99(YXXM1004)

Purpose: Creates annual MQMS M1-3 Age/Sex Adjustment Count Files from the 1999 MQMS Base Analytic Denominator File. These counts will be used to age and age/sex adjust MQMS outcome measures.

Program Steps:

Step 1: Perform frequencies on age, sex, and age/sex for the M1-3 cohort, and write these counts to a file. This, as defined in M1PROD, is only done for 1999.

Step 2: PROC CONTENTS and PROC PRINT on the analytic age/age-sex adjustment file.

3.1.5 Macro Program: D#MSQ.@MSQ00M1.PGMLIB99(SYSM105)

Input Files:	D#MSQ.@MSQ0000.SAS.YXXM1003.M1CNTSXX
Output Files:	Generates mainframe reports in text format as part of output

Purpose: Macro call to program YXXM1005 and passes the YEAR parameter (as defined in M1PRODXX) on to YXXM1005.

3.1.5.1 Called Program: D#MSQ.@MSQ00M1.PGMLIB99(YXXM1005)

Purpose: Creates formatted mainframe reports of M1-3 and M1-4 enrollment counts. Creates formats for the variable values, orders the variables and their values in the order they are to be displayed and generates mainframe reports for M1-3 and M1-4.

Program Steps:

Step 1: Create formats used when writing out the reports of counts for M1-3 and M1-4 by sub-groupings.

Step 2: Order geographic categories by census region, then the census divisions within the region, followed by the states within the region. This puts the data in the order to be generated in the mainframe reports.

Step 3: Read in counts file from YXXM1003 and sort it to put the non-geographic variables first, followed by the ordered geographic categories. Create two temporary files -- TEMPORARY2 has all non-geographical subgroups and TEMPORARY3 has the geographical subgroups.

Step 4: Put a total count at the top of the file and convert the counts to thousands.

Step 5: Set up 2 do loops. The first loop generates two reports for M1-3. The first report is generated from TEMPORARY2 (non-geographic subgroups) and the second report is generated from TEMPORARY3 (geographic subgroups). Once the reports are generated for M1-3, the second do loop runs and generates the reports for M1-4.

3.1.6 Macro Program: D#MSQ.@MSQ00M1.PGMLIB99(SYSM106)

Input Files: D#MSQ.@MSQ0000.SAS.Y99M1002.DENOMBXX
Output Files: D#MSQ.@MSQ0000.SAS.YXXM1006.M1CNTSXX

Purpose: Macro call to the program YXXM1006. This macro passes the YEAR parameter (as defined in M1PRODXX) on to YXXM1006.

3.1.6.1 Called Program: D#MSQ.@MSQ00M1.PGMLIB99(YXXM1006)

Purpose: Creates annual MQMS M1-3 and M1-4 Denominator Count Files from the MQMS Base Analytic Denominator Files, by subgroup and age categories and by subgroup and age/sex categories. These counts are the denominators for selected MQMS outcome measures. This program mirrors YXXM1003.

Program Steps:

Step 1: Sort the Base Analytic Denominator File by beneficiary age and sex.

Step 2: Create new age and sex variables to be used in the "by" statements when frequencies of the subgroups are run because age and sex are also subgroup variables.

Step 3: Prepare the cohorts to create the counts. Set up do loops for the 2 cohorts with the first loop applying to M1-3 and the second to M1-4. The do loop runs through the first 4 steps of this program for M1-3 before running for M1-4. Set the July indicator for the M1-3 cohort and set it to missing for the M1-4 cohort since it is not applicable. Set the 9 subgroupings for the counts (census division, census region, dual eligibility -July dual flag for M1-3 and dual flag for M1-4, age group, Medicare status, race, sex, state, and urban/rural status).

Step 4: Output frequencies for each of the 9 subgroups by age and sex to 9 temporary files (TEMPORARY1 - TEMPORARY9) corresponding to the 9 subgroups (e.g., TEMPORARY1 has the frequency for census division) for each of the 2 cohorts.

Step 5: Prepare the 9 temporary files to be alphabetically consolidated into one file by putting the first three letters of the variable name in front of the value, creating a generic variable heading with the analytic year in the title, and creating a heading for the counts indicating the year of analysis and the cohort. Create a 10th temporary file that equals the total number of people in the cohort. Use the urban frequency to create the total. At this point there are still 10 separate temporary files.

Step 6: Stack the 10 temporary files alphabetically to create TEMPORARYA1 (for M1-3 cohort) and then delete the TEMPORARY1-10 files. This is the end of the first do loop. The program now goes back and runs the same steps for M1-4, ultimately creating TEMPORARYA2 for the M1-4 cohort.

Step 7: Merge the 2 cohort files together. As a precaution, if either of the cohorts has no observations for any of the values in a subgroup, it is set to 0 (e.g., no beneficiaries of female gender in M1-4).

Step 8: Perform a PROC CONTENTS and PROC PRINT on the analytic count file.

Description of Processing for M2 - Frequency and Rate of Hospital Discharges per 1,000 Full-Year Medicare FFS Enrollees from Short-Stay Hospitals by the HCQIP Surveillance Diagnosis Groups by Age Group, Sex, Race, Medicare Eligibility, Medicaid Enrollment Status, and Geographic Region, Calendar Years 1992-2001, and M3 - Frequency and Rate of Hospital Discharges per 1,000 Full-Year Medicare FFS Enrollees from Short-Stay Hospitals by the HCQIP Surveillance Procedure Groups by Age Group, Sex, Race, Medicare Eligibility, Medicaid Enrollment Status, and Geographic Region, Calendar Years 1992-2001.

Please note that the M2 and M3 catalogued procedures and SAS programs for the years 1992-2000 are stored in the D#MSQ.@MSQ00M2.PGMLIB99 and D#MSQ.@MSQ00M3.PGMLIB99, while production M2 JCL, catalogued procedures, and SAS programs for the year 2001 are stored in D#MSQ.@MSQ00M2.PGMLIB01. The M3 production JCL for the year 2001 is stored in D#MSQ.@MSQ00M2.PGMLIB01, while the M3 catalogued procedures and SAS programs for 2001 are stored in D#MSQ.@MSQ00M3.PGMLIB99. To avoid confusion, we have listed only the D#MSQ.@MSQ00M2.PGMLIB99 and D#MSQ.@MSQ00M3.PGMLIB99 locations below. However, in the cases where 2001 input or output datasets are named differently than their 1992-2000 counterparts, we have explicitly listed that name. In addition, the JES logs, SAS logs, and SAS lists for the 1992-2000 programs are found in D#MSQ.@MSQ00M2.JOBLIBXX and D#MSQ.@MSQ00M3.JOBLIBXX. There exist no such files for the year 2001.

4. PROGRAM: ACCESS 100% DSAF FOR MEDPAR FILES DATA

Output Files: TI03.@MSQ0000.D#MSQ.MPAR92.SSLs.#010301
 TI03.@MSQ0000.D#MSQ.MPAR93.SSLs.#010301
 TI03.@MSQ0000.D#MSQ.MPAR94.SSLs.#010401
 TI03.@MSQ0000.D#MSQ.MPAR95.SSLs.#010401
 TI03.@MSQ0000.D#MSQ.MPAR96.SSLs.#010401
 TI03.@MSQ0000.D#MSQ.MPAR97.SSLs.#010401
 TI03.@MSQ0000.D#MSQ.MPAR98.SSLs.#010501
 TI03.@MSQ0000.D#MSQ.MPAR99.SSLs.#010501
 TI03.@MSQ2000.D#MSQ.MPAR00.SSLs.#100501

Purpose: Access 100% MedPAR File from Decision Support Access Facility (DSAF) for each year, 1992-2001. Provides access to the flat 1992-2001 MedPAR Files:

Step 1:

```
*****
      U T I L I Z A T I O N   M E N U
*****
```

1. MEDPAR (500 BYTE - FISCAL YEAR 1991 - 1998)
 CALENDAR YEAR 1991 - 1998)

2. MEDPAR (514 BYTE - FISCAL YEAR 1996 - 2000)
CALENDAR YEAR 1996 - 2000)

R. RETURN TO HISTORIC MAIN MENU

PLEASE ENTER SELECTION ==> 1

Step 2:

M E D P A R D A T A

1. FINDER MATCH TO MEDPAR RECORDS
 2. SELECT MEDPAR RECORDS
 3. CREATE MEDPAR 14-BYTE FINDER FILE
- R. RETURN TO UTILIZATION MENU

PLEASE ENTER SELECTION ==> 2

=====

fields available:

Step 3:

M E D P A R D A T A F I E L D S E L E C T I O N

1. STATE CODE (NUMERIC)
 2. ZIPCODE
 3. PROVIDER STATE (NUMERIC)
 4. PROVIDER NUMBER
 5. ICD-9 DIAGNOSTIC CODE
 6. ICD-9 PROCEDURE CODE
 7. STATE CODE AND COUNTY CODE
 8. STATE CODE AND PROVIDER STATE
 9. STATE CODE, PROVIDER STATE AND DIAGNOSTIC CODE
 10. STATE CODE, PROVIDER STATE AND PROCEDURE CODE
 11. STATE CODE, ICD-9 DIAGNOSTIC CODE AND ICD-9 PROCEDURE CODE
 12. PROVIDER NUMBER, ICD-9 DIAGNOSTIC CODE AND ICD-9 PROCEDURE CODE
 13. ICD-9 DIAGNOSTIC RELATED GROUP CODE
- R. RETURN TO PREVIOUS MENU

ENTER SELECTION ==>

=====

Step 4:

S E L E C T M E D P A R R E C O R D S

1. SELECT BY DATA FIELDS

- 2. SELECT BY PERCENT
- R. RETURN TO PREVIOUS MENU

PLEASE ENTER SELECTION ==> 2

Step 5:

```
*****
MEDPAR INPUT FILE SELECTION
*****
```

- 1. SHORT STAY/LONG STAY MEDPAR
- 2. SKILLED NURSING FACILITY MEDPAR ONLY
- 3. ALL MEDPAR FILES
- R. RETURN TO PREVIOUS MENU

ENTER SELECTION ==> 1

Step 6:

```
*****
      OUTPUT FILE INFORMATION
*****
```

```
*** ACCOUNTING INFORMATION, STUDY NAME, AND CREATION DATE ***
*** WILL ALL BE INCLUDED IN THE OUTPUT DATASET(S) NAMES ***
*** (TO RETURN TO PREVIOUS MENU, TYPE "R" ON ANY ENTRY LINE) ***
```

PLEASE ENTER ACCOUNTING INFORMATION (MUST BE LENGTH OF 11 CHARACTERS)
 ==> msq00000000

PLEASE ENTER STUDY NAME (NO MORE THAN 8 CHARACTERS ALLOWED)
 ==> d#msq

PLEASE IDENTIFY STUDY TYPE
 0 = SURGICAL OR CNTL
 1 = MEDICAL OR CASE
 OR ANY OTHER 1-DIGIT ALPHANUMERIC ENTRY, OR "@" FOR A BLANK
 ==> 1

PLEASE ENTER CREATION DATE FOR OUTPUT FILE (MMDDYYYY)
 ==> 01032001

```
*****
      PLEASE CHECK INFORMATION ENTERED
      (YOU MAY WISH TO PRINT SCREEN FOR FUTURE USE)
```

SELECT MEDPAR RECORDS

1 MEDPAR VERSION: CY

```

2             MEDPAR YEAR: 1999
4     MEDPAR INPUT FILES: SS AND LS
5             ACCOUNT: MSQ00000000
6             STUDY NAME: D#MSQ
7             STUDY TYPE: MEDICAL/CASE
8 OUTPUT FILE CREATION DATE: 010501
-   MEDPAR OUTPUT FILE NAME: TI03.@MSQ0000.D#MSQ.MPAR99.SSLs.#010501
9             SAMPLE SELECTION: 100%
*****
TYPE "C" IF INFORMATION IS CORRECT.           TYPE "A" TO RE-ENTER ALL DATA
SHOWN.
TYPE "R" TO RETURN TO PREVIOUS SCREEN.       TYPE "E" TO EXIT TO MAIN MENU.
OR, TYPE THE ITEM NUMBER WHICH YOU WANT TO RE-ENTER, ("1" THRU "9",
ABOVE)
PLEASE ENTER SELECTION ==> c

```

IKJ56250I JOB TI03MP48(JOB11627) SUBMITTED

PLEASE NOTE JOB NUMBER SUBMITTED.
JCL HAS BEEN SAVED IN TI03.TEMPORARY.MEDPAR48.CNTL.

PLEASE LOOK FOR YOUR OUTPUT FILE UNDER
TI03.@MSQ0000.D#MSQ.MPAR99.SSLs.#010501

(REMINDER: OUTPUT FILE IS COMPRESSED).

PRESS <ENTER> TO RETURN TO MEDPAR MENU

```

=====
01  HHA SKELETON                      11  MEDPAR 500 NCHB (06/95-)
02  OP SKELETON                      12  MEDPAR 500 (UNPACKED 06/95-)
03  MADRS                            13  MEDPAR HOSPITAL 330 (1983-)
04  HCPCS                            14  5% PART B BENE (HISKEW
05  PROVIDER SUMMARY                 15  1984-1990 VARIABLE)
06  MEDPRO (06/95-)                 16  5% PART B BENE (AHCPR FIXED)
07  MEDPAR 500 DSAF (1987-03/95)    17  PART B PROCEDURE (1991-)
08  MEDPAR 500 NCHB (12/93-03/95)  18  PART B PROCEDURE (AHCPR)
09  MEDPAR 500 (UNPACKED 1987-    19  PART B PROVIDER (1984-90)
   03/95)                          20  PART B PREVAILING CHARGE
10  MEDPAR 500 DSAF (06/95-)        BESS SPECIAL INTEREST FILE
11  MEDPAR 500 NCHB (06/95-)
12  MEDPAR 500 (UNPACKED 06/95-)
13  MEDPAR HOSPITAL 330 (1983-)
14  5% PART B BENE (HISKEW
   1984-1990 VARIABLE)
15  5% PART B BENE (AHCPR FIXED)
16  PART B PROCEDURE (1991-)
17  PART B PROCEDURE (AHCPR)
18  PART B PROVIDER (1984-90)
19  PART B PREVAILING CHARGE
20  BESS SPECIAL INTEREST FILE

```

P PREVIOUS MENU

99 MAIN MENU

07 YOUR DATASET NAME IS TI03.@BEB3002.MEDPAR5

10 YOUR DATASET NAME IS TI03.@BEB3002.MEDPAR5D

5. PRODUCTION JCL: D#MSQ.@MSQ00M2.PGMLIBxx(M2PRExx)

Purpose: This job executes the cataloged procedure M2PRE for a particular year (e.g., M2PRE92 for 1992). It specifies three parameters that are passed on to the M2PRE procedure: (1) the 2-digit year of analysis (e.g., 92 for 1992), (2) the file name of the flat MedPAR file from the DSAF extraction (e.g., TI03.@MSQ0000.D#MSQ.MPAR92.SSLs.#010301 for 1992), and (3) the record length of the MedPAR file (e.g., A = 500 for 1992 through 1998 and B = 514 for 1999 and 2000). To run this job for other years, simply define for that year these three parameters that will be passed on to M2PRE (the next program), which will then pass it on to all the subsequent programs. Programs SYSM2P1 through SYSM2P5 are then run based on the execution of this M2PRE procedure. Therefore, all output generated from subsequent programs will all be in one document (D#MSQ.@MSQ00M2.JOBLIBXX(M2PREXX)).

5.1 Catalogued Procedure: D#MSQ.@MSQ00M1.PGMLIB99(M2PRE)

Purpose: This is a cataloged procedure with seven steps. Each of the seven steps executes a program (named SYSM2P1 through SYSM2P7). The parameters defined in M2PREXX are passed onto this procedure, defining the year, the flat MedPAR file, and the record length of the MedPAR file to which these subsequent programs will be executed. These programs are steps in creating a pre-analytic file. The first step is described below in more detail with the subsequent steps provided in the order they are executed. The job steps are defined based on the EXEC statement.

5.1.1 Macro Program: D#MSQ.@MSQ00M2.PGMLIB99(SYSM2P1A) D#MSQ.@MSQ00M2.PGMLIB99(SYSM2P1B)

Input Files: TI03.@MSQ0000.D#MSQ.MPAR92.SSLs.#010301
TI03.@MSQ0000.D#MSQ.MPAR93.SSLs.#010301
TI03.@MSQ0000.D#MSQ.MPAR94.SSLs.#010401
TI03.@MSQ0000.D#MSQ.MPAR95.SSLs.#010401
TI03.@MSQ0000.D#MSQ.MPAR96.SSLs.#010401
TI03.@MSQ0000.D#MSQ.MPAR97.SSLs.#010401
TI03.@MSQ0000.D#MSQ.MPAR98.SSLs.#010501
TI03.@MSQ0000.D#MSQ.MPAR99.SSLs.#010501
TI03.@MSQ2000.D#MSQ.MPAR00.SSLs.#100501
TI02.@@MS0000.D#MSQ.MPAR01.SSLs.#082302

Output Files: D#MSQ.@MSQ0000.FLAT.M2PRE1.SELECTxx
D#MSQ.@MSQ0000.FLAT.M2PRE1.IDSxx

Purpose: Selects short-stay acute care hospitals and deletes duplicate records. SYSM2P1A is run for 1992 through 1998 (A = 500 byte record length) and SYSM2P1B is run for 1999 through 2001 (B = 514 byte record length) as defined in M2PRExx.

Program Steps:

Step 1: Read in the flat MedPAR file and select short-stay acute care hospital claims (defined as MedPAR provider number special unit code equal to missing, and MedPAR provider number third position code equal to 0).

Step 2: Sort selected records (record is read in as one string), and delete duplicate records.

Step 3: Write out two flat files:

- 1) Full flat MedPAR file of selected records
- 2) Flat file of IDs (first 11 characters from the selected MedPAR records)

5.1.2 Macro Program: D#MSQ.@MSQ00M2.PGMLIB99 (SYSM2P2)

Input Files: D#MSQ.@MSQ0000.FLAT.M2PRE1.IDSxx
 Output Files: D#MSQ.@MSQ0000.SAS.M2PRE2.XREFMPxx

Purpose: Takes the HICNO file and reads it into a SAS file. Also assigns each record an observation number (NOBS). This file will be used to cross-reference the MedPAR file.

Program Steps:

Step 1: Read in the flat MedPAR ID file, name the IDs XREF (referring to an historical ID that a beneficiary has at that point in time), assign each record an observation number (NOBS), and write out a SAS file.

Step 2: Perform a PROC CONTENTS and PROC PRINT on the SAS ID files.

5.1.3 Macro Program: D#MSQ.@MSQ00M2.PGMLIB99 (SYSM2P3A) D#MSQ.@MSQ00M2.PGMLIB99 (SYSM2P3B)

Input Files: D#MSQ.@MSQ0000.FLAT.M2PRE1.SELECTxx
 Output Files: D#MSQ.@MSQ0000.SAS.M2PRE3.MEDPARxx

Purpose: Creates a SAS MedPAR file. SYSM2P3A is run for 1992 through 1998 (A = 500 byte record length) and SYSM2P3B is run for 1999 through 2001 (B = 514 byte record length) as defined in M2PRExx.

Program Steps:

Step 1: Read in the flat MedPAR file that contains the short-stay acute care hospital records and write out a SAS file.

Step 2: Create labels for the variables on the SAS file.

Step 3: Create an observation number (NOBS) that mirrors that in the MedPAR ID file.

Step 4: PROC CONTENTS and PROC PRINT on the SAS MedPAR files.

5.1.4 Macro Program: D#MSQ.@MSQ00M2.PGMLIB99 (SYSM2P4)

Input Files: D#MSQ.@MSQ00M2.PGMLIB99 (SDGFORM)
D#MSQ.@MSQ0000.SAS.M2PRE3.MEDPARxx

Output Files: Two temporary files:
1. YxxD1 – out-of-range primary diagnosis codes
2. YxxD2 – out-of-range secondary diagnosis codes

Purpose: Matches the primary and secondary MedPAR diagnosis codes to the SDGs provided by CMS. Diagnoses that do not map to an SDG are output in one of two temporary files.

Program Steps:

Step 1: Temporary data step that creates two output files – YxxD1 for primary diagnoses that do not match to an SDG and YxxD2 for any secondary diagnoses that do not match to an SDG.

Step 2: Read in the SAS MedPAR file.

Step 3: Select the number of diagnosis fields that have values (e.g., if a record only has values in DIAG1 – DIAG3, then only three fields are checked when mapped to the SDG format).

Step 4: Format the diagnoses into the SDG format. Non-matching diagnoses are outputted to YxxD1 (if DIAG1 did not match) or YxxD2 (if a secondary diagnosis (DIAG2–DIAG10) did not match).

Step 5: Perform frequencies on the diagnoses in D1 and D2.

5.1.5 Macro Program: D#MSQ.@MSQ00M2.PGMLIB99 (SYSM2P5)

Input Files: D#MSQ.@MSQ00M2.PGMLIB99 (SPGFORM)
D#MSQ.@MSQ0000.SAS.M2PRE3.MEDPARxx

Output Files: One Temporary File:
YxxP – out-of-range surgical procedure codes

Purpose: Matches the MedPAR surgical procedure codes to the SPGs provided by CMS. Procedures that do not map to an SPG are output in a temporary file.

Program Steps:

Step 1: Temporary data step that creates an output file for procedures that do not match to an SPG.

Step 2: Read in the SAS MedPAR file.

Step 3: Select the number of surgical procedure fields that have values (e.g., if a record only has values in SPROC1 – SPROC3, then only three fields are checked when mapped to the SPG format).

Step 4: Map the procedure codes into the SPG format. If the procedure codes do match, then output non-matches to YxxP.

Step 5: Perform frequencies on the procedures in YxxP.

5.1.6 Macro Program: D#MSQ.@MSQ00M2.PGMLIB99(SYSM2P6)

Input Files: D#MSQ.@MSQ0000.FLAT.M2PRE1.IDSxx
Output Files: D#MSQ.@MSQ0000.FLAT.M2PRE6.XREFxx

Purpose: Creates a list of unique MedPAR beneficiary IDs to be used for cross-referencing.

Program Steps:

Step 1: Sort by beneficiary ID (first 11 characters).

Step 2: Resolve duplicates to one record.

5.1.7 Macro Program: D#MSQ.@MSQ00M2.PGMLIB99(SYSM2P7)

Input Files: D#MSQ.@MSQ0000.FLAT.M2PRE6.XREFxx
Output Files: D#MSQ.@MSQ0000.FLAT.M2PRE7.XREFxx.01-09

Purpose: CMS recommends 1 million record files for DSAF processing, thus the unique ID file is broken down into several 1 million observation files.

Program Steps:

Step 1: Copy IDs from the unique ID file into 1 million record files.

6. PRODUCTION JCL: D#MSQ.@MSQ00M2.PGMLIBxx(M2PRODxx)

Purpose: This job executes the cataloged procedure M2PROD for a particular year (e.g., M2PROD92 for 1992). To run this job for other years, simply define the year of analysis in the YEAR parameter (2 digit year). This parameter will be passed on to M2PROD (the catalogued procedure), which passes it on to all the subsequent programs. Programs SYSM200 through SYSM207 are run based on the execution of this M2PROD procedure. Therefore, all output generated from subsequent programs is contained in one document (D#MSQ.@MSQ00M2.JOBLIBxx(M2PRODxx)).

6.1 Catalogued Procedure: D#MSQ.@MSQ00M2.PGMLIB99(M2PROD)

Purpose: This is a cataloged procedure with seven steps. Each of the seven steps executes a SAS program (named SYSM200 through SYSM207). SYSM201 through SYSM207 execute a call to a corresponding SAS macro program (YXXM2001 through YXXM2007) – note that SYSM202 and YXXM2002 do not exist. The YEAR parameter defined in M2PRODXX is passed onto this program, defining the year to which these subsequent programs are executed. These programs are steps in creating the final analytic files of beneficiary hospital discharge claims. The first step is described below in more detail with the subsequent steps provided in the order they are executed. The job steps are defined based on the EXEC statement.

6.1.1 Macro Program: D#MSQ.@MSQ00M2.PGMLIB99(SYSM200)

Input Files:	D#MSQ.@MSQ00M2.PGMLIB99(M2XREFXX) D#MSQ.@MSQ00M2.PGMLIB01(M2XREF01)
Output Files:	D#MSQ.@MSQ0000.SAS.M2XREF.FINDRXX

Purpose: Combine all DSAF generated cross-reference files for a given year and construct a file with all unique HICNO and XREF combinations, wherein the former shall be the unique identifier for each person in the MedPAR file for the given year.

Program Steps:

Step 1: Read in a SAS filename statement that references all of the DSAF output for cross-referencing for a given year.

Step 2: Read all IDs from all the DSAF output for a given year.

Step 3: Sort the unique XREF/HICNO file by HICNO.

Step 4: Check to see if HICNO matches to an historical ID. If not, HICNO is added as an historical ID (XREF). CMS maintains a cross-reference file that keeps track of changes in beneficiary IDs. “Historical ID” in this reference refers to any ID that a beneficiary had or has in the cross-reference file. Having a list of all IDs a beneficiary had over time allows for

the identification of all MedPAR records affiliated with a beneficiary should there have been a change in their ID during the calendar year.

Step 5: Sort the consolidated file by XREF and then HICNO resolving duplicates to one record.

Step 6: Select all unique XREF/HICNO combinations from the consolidated file.

Step 7: Sort the updated file from previous steps by XREF/HICNO and output it as a permanent file.

Step 8: PROC PRINT and PROC CONTENTS on the XREF/HICNO file.

6.1.2 Macro Program: D#MSQ.@MSQ00M2.PGMLIB99(SYSM201)

Input Files:	D#MSQ.@MSQ0000.SAS.M2PRE3.MEDPARxx D#MSQ.@MSQ00M2.PGMLIB99(SPGFORM)
Output Files:	D#MSQ.@MSQ0000.SAS.YXXM2001.MEDPRBxx D#MSQ.@MSQ0000.SAS.YXXM2001.XMEDBxx

Purpose: Macro call to the program YXXM2001. This macro passes the YEAR parameter (as defined in M2PRODxx) on to YXXM2001.

6.1.2.1 Called Program: D#MSQ.@MSQ00M2.PGMLIB99(YXXM2001)

Purpose: Identify records that meet any of the following exclusion criteria: 1) stand-alone emergency room claims, 2) demonstration claims, or 3) contain an out-of-range procedure code. Create a new MedPAR file without these claims and save the deleted records to another file. **Please note that the “XX” in the program title does not represent an abbreviation for all years. The program is actually named YXXM2001. This is true for all called programs listed for M2.**

Program Steps:

Step 1: Read in the SPG format.

Step 2: Create two data sets. The first data set is the new MedPAR file without claims that meet the exclusion criteria (MEDPRBXX), and the second data set contains the NOBS and the variable identifying the reason for exclusion for the excluded records (XMEDBxx).

Step 3: Set the length of the four variables created in this program (YYYEX, I, BADPROC, and COUNT). Read in the MedPAR file and set in arrays for the variables to be used to define the exclusion criteria.

Step 4: Create the BADPROC and COUNT variables that are used in the identification of claims with invalid procedure codes and ER claims. BADPROC is the sum of the number of

surgical procedure codes on a claim that did not match to the SPG format when the variable was not equal to missing. BADPROC has values of 0 through 6. COUNT is the sum of ACCHRG1-5 (accommodations charges).

Step 5: Create an exclusion criteria that tracks the variable YYYEX for claims identified in the following 3 ways:

- 1) Stand-alone ER claims are claims where a beneficiary dies in the emergency room without any record of a hospital admission. Claims that meet all three of the following criteria are considered stand-alone ER claims: MedPAR Discharge Destination equals '20' or MedPAR Discharge Status Code equals 'B'; and the sum of all MedPAR Accommodation Charges is equal to 0 (COUNT = 0); and the MedPAR Emergency Room Service Charge is greater than 0.
- 2) Demonstration Claims are defined as claims with the 4th-6th positions of the MedPAR Provider Identification Number in the 880 to 899 range.
- 3) Claims with invalid ICD-9 procedure code values in any one or more of the MedPAR six surgical procedure fields (BADPROC > 0).

Step 6: If the exclusion variable (YYYEX) is greater than zero then the NOBS and the exclusion variable of the claim is output to the file XMEDBXX. All other claims are saved to MEDPRBXX. Next, perform a frequency on the exclusion variable (YYYEX). This three digit variable translates into a three digit binary number, of which each digit identifies the reason for exclusion and is read left to right.

1st digit = 1, if stand-alone Emergency Room claim
2nd digit = 1, if a demonstration or test claim
3rd digit = 1, if claim had an invalid procedure code

Step 7: PROC CONTENTS and PROC PRINT on the XMEDBxx and MEDPRBxx files.

6.1.3 Macro Program: D#MSQ.@MSQ00M2.PGMLIB99(SYSM203)

Input Files:	D#MSQ.@MSQ0000.SAS.M2XREF.FINDRxx
	D#MSQ.@MSQ0000.SAS.M2PRE2.XREFMPxx
	D#MSQ.@MSQ0000.SAS.YXXM2001.MEDPRBxx
Output Files:	D#MSQ.@MSQ0000.SAS.YXXM2003.MEDPRCxx

Purpose: Macro call to the program YXXM2003. This macro passes the YEAR parameter (as defined in M2PRODxx) on to YXXM2003.

6.1.3.1 Called Program: D#MSQ.@MSQ00M2.PGMLIB99(YXXM2003)

Purpose: Create a new MedPAR SAS file by adding on a unique identifier for each person with claims, select only the variables needed from the MedPAR file generated in program YXXM2001, and generate 2 new payment variables.

Program Steps:

Step 1: This step is needed because the file layouts are different for the 1999 and 2000 MedPAR files affecting the organ acquisition charge variable name.

Step 2: Rename the variables to include year markers and identifies them as NEWNAME so that these variables are easily selected to keep later in the program.

Step 3: Specify the variables to keep – those identified as NEWNAME.

Step 4: Merge the XREFMPxx file (IDs from the MedPAR file) and the FINDRxx file (unique HICNO/XREF file). Matches go to temporary file MPAR2. Non-matches to the FINDRxx file go to a temporary file ERR. Perform a PROC PRINT on ERR.

Step 5: Sort MPAR2 file by NOBS to prepare for the merge to the MEDPRBxx file. Rename NOBS and HICNO with year markers to match other MEDPRBxx file names.

Step 6: Create MEDPRCxx file after merging MEDPRBxx with MPAR2 by NOBS. Prepare the file to allow for the identification of all claims for a beneficiary if their ID changed during the year. Create an array in preparation for the creation of two new payment variables. Create two payment variables – YxxTPAY and YxxBPAY. Any negative values for the variables used to create the payment variables are set to 0. Total Medicare Payment (YxxTPAY) is a constructed variable from three other MedPAR variables: MedPAR Medicare Payment Amount + MedPAR Total Per-Diem Pass Thru Amount + MedPAR Organ Acquisition Charge Amount. Total Beneficiary Liability (YxxBPAY) is constructed from three other MedPAR variables: MedPAR Beneficiary Part A Coinsurance Liability Amount + MedPAR Beneficiary Inpatient Deductible Liability Amount + MedPAR Beneficiary Blood Deductible Liability Amount.

Step 7: Create labels for new variables.

Step 8: Perform a PROC CONTENTS and PROC PRINT on the MEDPRCxx file.

6.1.4 Macro Program: D#MSQ.@MSQ00M2.PGMLIB99 (SYSM204)

Input Files:	D#MSQ.@MSQ0000.SAS.M2XREF.FINDRxx
	D#MSQ.@MSQ0000.SAS.M2PRE2.XREFMPxx
	D#MSQ.@MSQ0000.SAS.YXXM2003.MEDPRCxx
	D#MSQ.@MSQ0000.SAS.YXXM1002.DENOMBxx
Output Files:	D#MSQ.@MSQ0000.SAS.YXXM2004.MEDPRDxx
	D#MSQ.@MSQ0000.SAS.YXXM2004.DENOMCxx
	D#MSQ.@MSQ0000.SAS.YXXM2004.BADIDSxx

Purpose: Macro call to the program YXXM2004. This macro passes the YEAR parameter (as defined in M2PRODxx) on to YXXM2004.

6.1.4.1 Called Program: D#MSQ.@MSQ00M2.PGMLIB99(YXXM2004)

Purpose: The purpose is twofold:

- 1) Create a new M2 analytic MedPAR file that flags any person who either does not match the file M1-4 (the M1-4 cohort file) or who does match, but that match is found to include two or more IDs on file M1-4 that represent the same person.
- 2) Create a modified M1-4 file that will contain only those persons selected by the above criteria. This file will be used to merge on the M1 information to form the Base M2 Analytic MedPAR File after we have finished cleaning the MedPAR claims.

Program Steps:

Step 1: Read in M1 Denominator file and select M14 cohort and their HICNO and OBS number. The HICNO is called XREF. Write out temporary file of M14 IDs sorted by XREF (M14X).

Step 2: Sort the latest MedPAR file (MEDPRCxx) by HICNO and create a unique listing of IDs. Create temporary dataset called FINDMP.

Step 3: Sort the finder file (FINDRxx) by HICNO and write out a temporary file called FINDR.

Step 4: Merge the finder file and the MedPAR ID file by HICNO that provides a list of everyone in the MedPAR file with their unique IDs and their historical ids. Delete temporary FINDR file. Sort the FINDMP file by the historical IDs to prepare to match to the MedPAR file.

Step 5: Merge M14 ID file (M14X) and MedPAR ID list with historical IDs (FINDMP). Matches go into temporary file MATCH1, non-matches to NOMATCH1.

Step 6: Because the Denominator File for M1 was never cross-referenced, there could be more than 1 record for a person in the M1 Denominator File. Beneficiaries with duplicate IDs on the Denominator File are excluded from the MedPAR file. Sort the MATCH1 file by HICNO (unique ID) to identify those beneficiaries with duplicate IDs. Duplicates go into temporary file DUPLIC1 while the rest of the beneficiaries remain in MATCH1.

Step 7: Sort NOMATCH1 by HICNO in preparation for merge to MedPAR file to identify true non-matches. Merge MATCH1 and NOMATCH1 by HICNO (unique ID). Matches select

historical IDs for MATCH1 IDs. If there is no match, output data to the temporary file NOM14 (not in M1-4 cohort).

Step 8: Create BADIDS1 that includes beneficiaries with duplicate IDs on the Denominator File (DUPLIC1) and true non-matches to the M1-4 cohort (NOM14).

Step 9: Merge the XREFMP (IDs and NOBS from complete MedPAR file prior to exclusions) and FINDMP (MedPAR unique IDs and historical IDs) files. Matches go into temporary file FINDER.

Step 10: Sort FINDER by HICNO and merge with BADIDS1. Matches go into the dataset BADIDSXX that provides the unique ID, historical ID, and NOBS information for beneficiaries to be excluded from the MedPAR file.

Step 11: Sort BADIDSxx by NOBS and create temporary dataset called BADIDS2 in preparation for merge to MEDPRCXX file.

Step 12: Merge the MEDPRCxx file with BADIDS2 by NOBS. Create the variable YxxNOM14 equal to '1' if they match, and equal to '0' if they do not match. Create a new MedPAR file (MEDPRDxx). Beneficiaries in cohort M1-4 have YxxNOM14 equal to '0'.

Step 13: Perform a PROC CONTENTS and PROC PRINT on MEDPRDxx.

Step 14: Prepare to merge the denominator file information onto the MedPAR file. Duplicates and non-matches to the MedPAR file are removed by first sorting MATCH1 by YXXDOBS and then merging MATCH1 with DENOMBxx by YxxDOBS. Matches go into the new Denominator File (DENOMCxx).

Step 15: Perform a PROC CONTENTS and PROC PRINT on DENOMCxx.

6.1.5 Program: D#MSQ.@MSQ00M2.PGMLIB99 (SYSM205)

Input Files:	D#MSQ.@MSQ0000.SAS.YXXM2004.MEDPRDXX
Output Files:	D#MSQ.@MSQ0000.SAS.YXXM2005.MEDPREXX
	D#MSQ.@MSQ0000.SAS.YXXM2005.MARKERXX

Purpose: Macro call to the program YXXM1005. This macro passes the YEAR parameter (as defined in M1PRODxx) on to YXXM1005.

6.1.5.1 Called Program: D#MSQ.@MSQ00M2.PGMLIB99 (YXXM2005)

Purpose: Identify and drop all overlapping claims. Information on overlapping claims is outputted to a disk file. Create a new MedPAR claims file excluding the overlapping claims.

Program Steps:

Step 1: Sort the latest MedPAR File (MEDPRDxx) by HICNO, admission date, discharge date, and PROVID to facilitate identification of overlapping claims. Next, output to the temporary file MPAR1.

Step 2: In preparation for identifying overlapping claims, create variables that represent information from a previous claim (lag variables) and a way to identify all overlapping claims affiliated with a discharge. Create a permanent data file (MARKERxx) that contains two variables – YxxNOBS (claims observation number) and CASENO (overlapping claims case number). Set the lengths of lagged variables and define all lagged variables.

Step 3: Read in MPAR1.

Step 4: Set up an algorithm to identify overlapping claims. Overlapping claims are defined as:

- 1) HICNOs are the same
- 2) Admission date is less than or equal to the discharge date

Record the claim number (observation number) and the case number (unique number for a set of related overlapping claims) for the overlapping claims.

Step 5: Perform a frequency on the CASENO variable and output to a temporary file (TEMPORARYCNT). Next, run means on the counts in the temporary file. N = number of overlapping episodes (CASENOs). Other summary statistics for the counts are minimum, maximum, mean, and standard deviation.

Step 6: Sort the MARKERxx file by observation number (YxxNOBS) in order to merge this information onto the latest MedPAR file in order to identify overlapping claims and remove them.

Step 7: Merge MARKERxx and MEDPRDxx file by YxxNOBS. Non-matches go into the new MedPAR file (MEDPRExx) – non-overlapping claims.

Step 8: Perform a PROC CONTENTS and PROC PRINT on MEDPRExx file.

6.1.6 Macro Program: D#MSQ.@MSQ00M2.PGMLIB99(SYSM206)

Input Files:	D#MSQ.@MSQ0000.SAS.YXXM2005.MEDPRExx
Output Files:	D#MSQ.@MSQ0000.SAS.YXXM2006.MEDPRFxx
	D#MSQ.@MSQ0000.SAS.YXXM2006.TRANSxx

Purpose: Macro call to the program YXXM2006. This macro passes the YEAR parameter (as defined in M2PRODxx) on to YXXM2006.

6.1.6.1 Called Program: D#MSQ.@MSQ00M2.PGMLIB99(YXXM2006)

Purpose: Select all claims that form transfer episodes. For each episode, resolve the group of claims to one claim, and create a new MedPAR file with these resolved claims. Save to disk the observation number and case number for each transfer claim.

Program Steps:

Step 1: Sort latest MedPAR File (MEDPRExx) by HICNO, admission date, discharge date, and PROVID to facilitate identification of transfer claims. Next, output to the temporary file MPAR1.

Step 2: In preparation for identifying transfer claims, create variables that represent information from a previous claim (lag variables) and a way to identify all transfer claims affiliated with a discharge. Create a permanent data file (TRANSxx) that contains three variables – YxxNOBS (claims observation number), CASENO (transfer claims case number), and COUNTS (rank variable providing the order of the transfer claims in a particular transfer episode). Set the lengths of lagged variables and define all lagged variables.

Step 3: Read in MPAR1.

Step 4: Set up an algorithm to identify transfer claims. Transfer claims are defined as:

- 1) HICNOs are the same
- 2) PROVIDs are not the same
- 3) admission date is equal to the previous discharge date or the previous discharge date plus 1
- 4) discharge destination equals 2.

For the transfer claims, record the claim number (observation number), the case number (unique number for a set of related transfer claims), and a rank order for the claims in each transfer episode.

Step 5: Perform a PROC CONTENTS and PROC PRINT on TRANSxx file.

Step 6: Perform a frequency on the CASENO variable and output to a temporary file (TEMPORARYCNT). Run means on the counts in the temporary file. N = number of transfer episodes (CASENOS). Other summary statistics for the counts are minimum, maximum, mean, and standard deviation.

Step 7: Sort the TRANSxx file by observation number (YxxNOBS) and output to temporary file (TOBS). This allows for this information to be merged onto the latest MedPAR file to identify transfer claims and resolve them to one claim.

Step 8: Merge TOBS and MEDPRExx file by YxxNOBS. If they match, pull relevant claim information for resolution of transfer cases. This information is stored in the temporary file MPAR2.

Step 9: Sort MPAR2 by CASENO and COUNTS. Perform a PROC PRINT first 10 observations.

Step 10: Create a new temporary file called MPAR1, which will contain the resolved transfer claims. Set arrays for payment variables to be summed. Read in MPAR2 file.

Step 11: Begin cleaning of transfers. The admission date comes from the first claim in a series of transfer claims and discharge date is the discharge date of the last claim in a series of transfer claims. Sum the payment variables. All other variable values (including YxxNOBS) come from the last discharge claim in a series of transfer claims. Perform a PROC PRINT on the first ten observations of MPAR1.

Step 12: Sort the TRANSxx dataset by YxxNOBS and write out to a temporary file T1. Sort the MPAR1 file by YxxNOBS.

Step 13: Merge on resolved claims and delete unresolved transfer claims. Merge the MEDPRExx, T1, and MPAR1 files. If there is a match to T1, but not to MPAR1, then delete the claim. All other claims are kept. Create the variable YxxTRF which is set equal to '1' if a claim is a resolved transfer claim, and set equal to '0' if the claim is a non-transfer claim. Create a new MedPAR file with the transfer claims resolved (MEDPRFxx).

Step 14: Perform a PROC CONTENTS and PROC PRINT on MEDPRFxx file.

6.1.7 Macro Program: D#MSQ.@MSQ00M2.PGMLIB99(SYSM207)

Input Files:	D#MSQ.@MSQ0000.SAS.YXXM2006.MEDPRFxx
	D#MSQ.@MSQ0000.SAS.YXXM2004.DENOMCxx
Output Files:	D#MSQ.@MSQ0000.SAS.YXXM2007.MEDPRGxx
	D#MSQ.@MSQ0000.SAS.YXXM2007.CONTIxx

Purpose: Macro call to the program YXXM2007. This macro passes the YEAR parameter (as defined in M2PRODxx) on to YXXM2007.

6.1.7.1 Program: D#MSQ.@MSQ00M2.PGMLIB99(YXXM2007)

Purpose: Create a variable that marks continuing care claims. Save the claim numbers for those claims to a permanent disk file. Create the M2 Base Analytic MedPAR File, with all appropriate M1 Denominator data included.

Program Steps:

Step 1: Sort latest MedPAR File (MEDPRFxx) by HICNO, admission date, discharge date, and PROVID to facilitate identification of continuing care claims. Output data to the temporary file MPAR1.

Step 2: In preparation for identifying continuing care claims, create variables that represent information from a previous claim (lag variables) and a way to identify all continuing care claims affiliated with a discharge. Create a permanent data file (CONTIxx) that contains the observation number (YxxNOBS). Set the lengths of lagged variables and define all lagged variables.

Step 3: Read in MPAR1.

Step 4: Set up an algorithm to identify continuing care claims. Continuing care claims are those claims where:

- 1) HICNOs are the same
- 2) PROVIDs are the same
- 3) admission date is equal to the previous discharge date or the previous discharge date plus 1
- 4) DRGCDs are the same

Record the claim number (observation number) for the claims in each continuing care episode for the continuing care claims.

Step 5: Perform a PROC CONTENTS and PROC PRINT on CONTIxx file.

Step 6: Sort the CONTIxx file by observation number (YxxNOBS). This allows for this information to be merged onto the latest MedPAR file to identify continuing care claims.

Step 7: In preparation for merging Denominator File information onto the MedPAR analytic file, sort DENOMCxx file by HICNO and write out to temporary file DENOM1 keeping YxxDOBS and HICNO. Also sort MEDPRFxx by YxxNOBS and HICNO and write out to temporary file MEDPAR1.

Step 8: Merge DENOM1 and MEDPAR1 by HICNO. Matches are written out to temporary file TEMPORARY1.

Step 9: Sort TEMPORARY1 by YXXDOBS (Denominator file observation number). Merge the files TEMPORARY1 and DENOMCXX by YXXDOBS. Matches are output to temporary file DENOM2.

Step 10: Sort DENOM2 by YXXNOBS (MedPAR file observation number). Read in SPG and SDG formats. Merge DENOM2 and CONTIxx onto the MEDPRFxx file and write out to new MedPAR file (MEDPRGxx). Matches have all the Denominator File information from DENOMCxx. Create the variable YxxCC that equals '1' if it is a continuing care claim, and that equals '0' if it is not a continuing care claim. Create YxxSDG and YxxSPG1—YxxSPG6, the formatted diagnosis and procedure group variables.

Step 11: Perform a PROC CONTENTS and PROC PRINT on MEDPRGxx file.

7. PRODUCTION JCL: D#MSQ.@MSQ00M2.PGMLIBxx(M2POSTxx)

Purpose: This job executes the cataloged procedure M2POST for a particular year (e.g., M2POST92 for 1992). To run this job for other years, simply define the relevant year of analysis in the YEAR parameter (2 digit year). This parameter is passed on to the cataloged procedure M2POST, which passes it on to all the subsequent programs. Programs SYSM208 through SYSM213 are then run based on the execution of this M2POST procedure. Therefore, all output generated from subsequent programs is in one document (D#MSQ.@MSQ00M2.JOBLIBxx(M2POSTxx)).

7.1 Catalogued Procedure: D#MSQ.@MSQ00M2.PGMLIB99(M2POST)

Purpose: This is a cataloged procedure with six steps. Each of the six steps executes a SAS program (named SYSM208 through SYSM213). SYSM208 through SYSM213 execute a call to a corresponding SAS macro program (YXXM2008 through YXXM2013) – note that SYSM209, SYSM210, and SYSM211 also call M2GENERL. The YEAR parameter defined in M2POSTxx is passed onto this program, defining the year to which these subsequent programs will be executed. These programs are steps in creating the final analytic files of beneficiary hospital discharge claims. The job steps are defined based on the EXEC statement.

7.1.1 Macro Program: D#MSQ.@MSQ00M2.PGMLIB99(SYSM208)

Input Files:	D#MSQ.@MSQ0000.SAS.YXXM2007.MEDPRGxx
Output Files:	D#MSQ.@MSQ0000.SAS.YXXM2008.YxxM2IN1

Purpose: Macro call to the program YXXM2008. This macro passes the YEAR parameter (as defined in M2POSTxx) on to YXXM2008.

7.1.1.1 Called Program: D#MSQ.@MSQ00M2.PGMLIB99(YXXM2008)

Purpose: Create an analytic count file calculating the number of discharges by SDG, age, sex, and the subgroups.

Program Steps:

Step 1: Assign major group variables to a macro variable to facilitate calculation of individual frequencies.

Step 2: Sort select variables from the Base Analytic MedPAR File by SDG, age group and sex for the M1-4 cohort. Write out sorted variables to the temporary file WORK0.TEMP1 file.

Step 3: Read in the temporary WORK0.TEMP1 file and add two variables - mirrored age and sex variables. The mirrored variables are created for ease of calculation for frequencies below.

Step 4: Create a do loop for the nine major subgroups.

Step 4a: Perform a frequency on the nine major subgroups by SDG, age group, and sex. Each of these is written out respectively to nine temporary files (TEMP1 through TEMP9).

Step 4b: Modify the nine temporary files, adding a variable YxxVARS that renames the values of the variables to take on the first three letters of the variable name plus the variable value applied as a suffix at the end (e.g., YxxSEX has values of 1 and 2. YxxVARS now has values of SEX1 and SEX2).

Step 4c: Create an individual dataset (TEMP10) with a new variable YxxVARS that has a value of TOTAL.

Step 5: Create a principal count file (YxxM2IN1) by concatenating the ten temporary files in alphabetical order.

Step 6: Perform a PROC PRINT and PROC CONTENTS on YxxM2IN1 file.

7.1.2 Macro Program: D#MSQ.@MSQ00M2.PGMLIB99(SYSM209)

Input Files:	D#MSQ.@MSQ0000.SAS.YXXM1003.M1CNTSxx D#MSQ.@MSQ0000.SAS.YXXM2008.YxxM2IN1 D#MSQ.@MSQ0000.SAS.YXXM1006.M1CNTSxx D#MSQ.@MSQ0000.SAS.YXXM1004.AGESEX99
Output Files:	D#MSQ.@MSQ0000.SAS.YXXM2009.YxxM2RAS

Purpose: Macro call to the program YXXM2009. This macro passes the YEAR parameter (as defined in M2POSTxx) on to M2GENERL and YXXM2009.

7.1.3 Macro Program: D#MSQ.@MSQ00M2.PGMLIB99(M2GENERL)

Purpose: This macro creates a table shell with one row for each analytical subgroup and as many columns as the number of different values of the variable VARNAME (for example for VARNAME = SDG the table will have 95 columns). This is designed to set to 0 all missing VARNAME counter/rate values.

Program Steps:

Step 1: Read in the M1CNTSxx files (Denominator counts files from M1). Sort by YxxVARS and delete duplicates to resolve to one for preparation of a table shell.

Step 2: Create file INI13 that takes the YxxVARS that are in rows and lays them out into columns. Write out variables into one row. Perform a PROC PRINT of INI13.

Step 3: Create table shell (temp dataset SHELL).

Step 4: PROC SORT SHELL by VARS (YxxVARS) and within VARS by VARNAME (VARNAME will be SDGs).

7.1.2.1 Called Program: D#MSQ.@MSQ00M2.PGMLIB99(YXXM2009)

Purpose: Create a SAS file with age/sex adjusted rates of admissions by SDG and subgroups.

Program Steps:

Step 1: Input counters from file YxxM2IN1 and write them out to 3 files: one file for age groups (INI2A), one file for sex groupings (INI2S), and one for all the remaining groups (INI2). A fourth file (ERR1) is created to write out counters where age or sex is missing as a quality check. There should be no observations in this file. Perform a PROC PRINT on ERR1.

Step 1a: Sort the three files by appropriate variables to eventually perform merges in order to construct rates.

Step 2: Create ASWGT99 (age/sex weight). Write out 3 weight files: age/sex (WGTA_S), age (WGT_A), and sex (WGT_S) from the AGESEX99 file created in M1. Perform a PROC PRINT on the three files.

Step 3: Create age/sex adjusted rates for all subgroups except age and sex.

Step 3a: Input counters from the Denominator file created in M1.

Step 3b: To construct the unadjusted rates per 1,000 beneficiaries for each age/sex cell, merge the INI2 temp file to the Denominator temporary count file INI3. Create the unadjusted rate per 1,000 beneficiaries (YXXRSDG) and output to TEMP1. The file ERR2 is created for observations in the INI2 file and not in Denominator counter file (INI3). Perform a PROC PRINT on ERR2.

Step 3c: Add a new variable (YxxASSDG) - the age/sex adjusted SDG rate - and output to TEMP2. Create the ERR3 file that has observations that have no weight in the Denominator File. Perform a PROC PRINT on ERR3.

Step 3d: Sum the above rate (YxxASSDG) by YxxVARS, YxxSDG, and YEAR and output to FINAL.

Step 4: Create sex adjusted rates for age subgroups.

Step 4a: Sum the Denominator File counters to adjust age groups by sex and write out to INI3A.

Step 4b: Create unadjusted rates per 1,000 beneficiaries (YxxRSDG) and output to TEMP1A.

Step 4c: Adjust rates by the 1999 sex weights (YxxASSDG) and output to TEMP2A.

Step 4d: Sum the above rate (YxxASSDG) by YxxVARS, YxxSDG, and YEAR and output to FINALA.

Step 5: Create age adjusted rates for sex subgroups.

Step 5a: Sum the Denominator File counters to adjust sex groups by age and write out to INI3S.

Step 5b: Create unadjusted rates per 1,000 beneficiaries (YxxRSDG) and output to TEMP1S.

Step 5c: Adjust rates by the 1999 age weights (YxxASSDG) and output to TEMP2S.

Step 5d: Sum the above rate (YxxASSDG) by YxxVARS, YxxSDG, and YEAR and output to FINALS.

Step 6: Create the dataset ALLS that puts all the rates (FINAL, FINALA, and FINALS) together in one file.

Step 7: Merge ALLS and the table shell from M2GENERL (SHELL) by YxxVARS and YxxSDG and output to YxxM2RAS. Values in SHELL that do not have a match to ALLS are set to 0. Values in ALLS that do not have a slot in SHELL are outputted to ERR4. Perform a PROC PRINT on ERR2. Perform a PROC PRINT and PROC CONTENTS on YxxM2RAS.

7.1.4 Macro Program: D#MSQ.@MSQ00M2.PGMLIB99(SYSM210)

Input Files:	D#MSQ.@MSQ0000.SAS.YXXM1003.M1CNTSxx
	D#MSQ.@MSQ0000.SAS.YXXM2008.YxxM2IN1
	D#MSQ.@MSQ0000.SAS.YXXM1004.AGESEX99
	D#MSQ.@MSQ0000.SAS.YXXM1006.M1CNTSxx
Output Files:	D#MSQ.@MSQ0000.SAS.YXXM2010.YxxM2ART

Purpose: Macro call to the program YXXM2010. This macro passes the YEAR parameter (as defined in M2POSTxx) on to M2GENERL and YXXM2010.

7.1.5 Program: D#MSQ.@MSQ00M2.PGMLIB99(M2GENERL)

Purpose and Program Steps: See explanation under section 7.1.3.

7.1.4.1 Called Program: D#MSQ.@MSQ00M2.PGMLIB99(YXXM2010)

Purpose: Create a SAS file with age adjusted rates of admissions by SDG and subgroups.

Program Steps:

Step 1: Input counters from file YxxM2IN1 and write them out to INI2. A second file (ERR1) is created to write out counters where age or sex is missing as a quality check. There should be no observations in this file. Perform a PROC PRINT on ERR1.

Step 2: Sum the count variable (YxxNSDG) by YxxFAGE, YxxVARS, YxxSDG, and YEAR and output to INI21.

Step 3: Sum the Denominator File counters by age group and YxxVARS in preparation for the creation of age weights and write out to INI31.

Step 4: Create AWGT99 (age weight). Write out an age weight file WGTA. Perform a PROC PRINT on WGTA.

Step 5: To construct the unadjusted rates per 1,000 beneficiaries for each age cell, merge the INI21 temp file to the Denominator temporary count file INI31. Create the unadjusted rate per 1,000 beneficiaries (YXXRSDG) and output to TEMP1. The file ERR2 is created for observations in INI21 file, and not in Denominator counter file (INI31). Perform a PROC PRINT on ERR2.

Step 6: Add a new variable (YxxAASDG) - the age adjusted SDG rate - and output to TEMP2. Age group rates remain unadjusted. Create the file ERR3 that contains observations that have no weight in the Denominator File. Perform a PROC PRINT on ERR3.

Step 7: Sum the above rate (YxxAASDG) by YxxVARS, YxxSDG, and YEAR and output to FINAL.

Step 8: Merge FINAL and the table shell from M2GENERL (SHELL) by YxxVARS and YxxSDG and output to YxxM2ART. Values in SHELL that do not have a match to FINAL are set to 0. Values in FINAL that do not have a slot in SHELL are output to ERR4. Perform a PROC PRINT on ERR4. Perform a PROC PRINT and PROC CONTENTS on YxxM2ART.

7.1.6 Macro Program: D#MSQ.@MSQ00M2.PGMLIB99 (SYSM211)

Input Files:	D#MSQ.@MSQ0000.SAS.YXXM1003.M1CNTSxx
	D#MSQ.@MSQ0000.SAS.YXXM2008.YxxM2IN1
Output Files:	D#MSQ.@MSQ0000.SAS.YXXM2011.YxxM2CNT
	D#MSQ.@MSQ0000.SAS.YXXM2011.YxxM2URT

Purpose: Macro call to the program YXXM2011. This macro passes the YEAR parameter (as defined in M2POSTxx) on to M2GENERL and YXXM2011.

7.1.7 Program: D#MSQ.@MSQ00M2.PGMLIB99 (M2GENERL)

Purpose and Program Steps: See explanation under section 7.1.3.

7.1.6.1 Called Program: D#MSQ.@MSQ00M2.PGMLIB99(YXXM2011)

Purpose: Create two SAS files, one with counters and the other with unadjusted rates of admissions by SDG and subgroups.

Program Steps:

Step 1: Input counters from file YxxM2IN1 and write them out to INI2. A second file (ERR1) is created to write out counters where age or sex is missing as a quality check. There should be no observations in this file. Perform a PROC PRINT on ERR1.

Step 2: Sum the count variable (YxxNSDG) by YxxVARS, YxxSDG, and YEAR and output to INI21.

Step 3: Merge INI21 and the table shell from M2GENERL (SHELL) by YxxVARS and YxxSDG and output to YxxM2CNT. Values in SHELL that do not have a match to INI21 are set to 0. Values in INI21 that do not have a slot in SHELL are output to ERR2. Perform a PROC PRINT on ERR2. Perform a PROC PRINT and PROC CONTENTS on YxxM2CNT.

Step 4: To construct the unadjusted rates per 1,000 beneficiaries for each cell, merge the YxxM2CNT file to the Denominator count file M1CNTSxx. Create the unadjusted rate per 1,000 beneficiaries (YxxRSDG) and output to YxxM2URT. Create the file ERR3 for observations in Denominator counter file (M1CNTSxx) and not in YxxM2CNT. Create the file ERR4 for observations in YxxM2CNT file and not in M1CNTSxx. Perform a PROC PRINT on ERR3 and ERR4. Perform a PROC PRINT and PROC CONTENTS on YxxM2URT.

7.1.8 Macro Program: D#MSQ.@MSQ00M2.PGMLIB99(SYSM212)

Input Files:	D#MSQ.@MSQ0000.SAS.YXXM2009.YxxM2RAS
	D#MSQ.@MSQ0000.SAS.YXXM2010.YxxM2ART
	D#MSQ.@MSQ0000.SAS.YXXM2011.YxxM2CNT
	D#MSQ.@MSQ0000.SAS.YXXM2011.YxxM2URT
Output Files:	D#MSQ.@MSQ0000.SAS.YXXM2012.YxxM2RAS.XPT
	D#MSQ.@MSQ0000.SAS.YXXM2012.YxxM2ART.XPT
	D#MSQ.@MSQ0000.SAS.YXXM2012.YxxM2CNT.XPT
	D#MSQ.@MSQ0000.SAS.YXXM2012.YxxM2URT.XPT

Purpose: Macro call to the program YXXM2012. This macro passes the YEAR parameter (as defined in M2POSTxx) on to YXXM2012.

7.1.8.1 Called Program: D#MSQ.@MSQ00M2.PGMLIB99(YXXM2012)

Purpose: Transpose data for input into tables. Create SAS transport files to download to a PC.

Program Steps:

Step 1: Transpose the input datasets to have the subgroups in rows and the counts or rates as columns.

Step 2: Create SAS transport files.

7.1.9 Macro Program: D#MSQ.@MSQ00M2.PGMLIB99(SYSM213)

Input Files:	D#MSQ.@MSQ0000.SAS.YXXM2012.YxxM2RAS.XPT D#MSQ.@MSQ0000.SAS.YXXM2012.YxxM2ART.XPT D#MSQ.@MSQ0000.SAS.YXXM2012.YxxM2CNT.XPT D#MSQ.@MSQ0000.SAS.YXXM2012.YxxM2URT.XPT
Output Files:	D#MSQ.@MSQ0000.SAS.YXXM2013.RTFRASxx D#MSQ.@MSQ0000.SAS.YXXM2013.RTFARTxx D#MSQ.@MSQ0000.SAS.YXXM2013.RTFCNTxx D#MSQ.@MSQ0000.SAS.YXXM2013.RTFURTxx

Purpose: Macro call to program YXXM2013 and passes the YEAR parameter (as defined in M2POSTxx) on to YXXM2013.

7.1.9.1 Called Program: D#MSQ.@MSQ00M2.PGMLIB99(YXXM2013)

Purpose: Create .RTF files from the transport files to be read into Microsoft Word.

Program Steps:

Step 1: Replace YxxVARS values with descriptive label-like values to be used in tables.

Step 2: Create a do loop that reads through the 4 transport files. Read in SAS transport file and copy it into a standard SAS file. Print these files and save them as .RTF files.

8. PRODUCTION JCL: D#MSQ.@MSQ00M3.PGMLIB99(M3POSTxx)²

Purpose: This job executes the cataloged procedure M3POST for a particular year (e.g., M3POST92 for 1992). To run this job for other years, simply define the relevant year of analysis in the YEAR parameter (2 digit year). This parameter will be passed on to M3POST (the catalogued procedure) which passes it on to all the subsequent programs. Programs SYSM301 through SYSM306 are run based on the execution of this M3POST procedure. Therefore, all output generated from subsequent programs is in one document (D#MSQ.@MSQ00M3.JOBLIBxx(M3POSTxx)).

8.1 Catalogued Procedure: D#MSQ.@MSQ00M3.PGMLIB99(M3POST)

Purpose: This is a cataloged procedure with six steps. Each of the six steps executes a SAS program (named SYSM301 through SYSM306). SYSM301 through SYSM306 execute a call to a corresponding SAS macro program (YXXM3001 through YXXM3006) – note that SYSM302, SYSM303, and SYSM304 also call M3GENERL. The YEAR parameter defined in M3POSTxx is passed onto this program, defining the year to which these subsequent programs will be executed. These programs are steps in creating the final analytic files of beneficiary hospital discharge claims. The job steps are defined based on the EXEC statement.

8.1.1 Macro Program: D#MSQ.@MSQ00M3.PGMLIB99(SYSM301)

Input Files:	D#MSQ.@MSQ0000.SAS.YXXM2007.MEDPRGxx
Output Files:	D#MSQ.@MSQ0000.SAS.YXXM3001.YxxM3IN1

Purpose: Macro call to the program YXXM3001. This macro passes the YEAR parameter (as defined in M3POSTxx) on to YXXM3001.

8.1.1.1 Called Program: D#MSQ.@MSQ00M3.PGMLIB99(YXXM3001)

Purpose: Create an analytic count file calculating the number of discharges by SPG, age, sex, and the subgroups. **Please note that the “XX” in the program title does not represent an abbreviation for all years. The program is actually named YXXM3001. This is true for all called programs listed for M3.**

Program Steps:

Step 1: Assign major group variables to a macro variable to facilitate calculating individual frequencies.

² Please note that the 2001 version of this production JCL is found in the M2 library D#MSQ.@MSQ00M2.PGMLIB01(M3POST).

Step 2: Read in the Base Analytic MedPAR file and create a single SPG variable from the six procedure variables (YxxSPG1-YxxSPG6) and write out to TEMP0. Unlike with the SPGs where only the principal diagnosis was mapped to a diagnosis group, there is no principal procedure. Therefore, a record is written out for each surgical procedure to allow for assigning to SPGs.

Step 3: Sort select variables from the Base Analytic MedPAR File by SPG, age group and sex for the M1-4 cohort. Write out sorted variables to temp file WORK0 . TEMP1 file.

Step 4: Read in the temporary WORK0 . TEMP1 file and add two variables - mirrored age and sex variables. The mirrored variables are created for ease of calculation for frequencies below.

Step 5: Create a do loop for the nine major subgroups.

Step 5a: Perform a frequency on the nine major subgroups by SPG, age group, and sex. Each of these is written out respectively to nine temporary files (TEMP1 through TEMP9).

Step 5b: Modify the nine temporary files, adding a variable YxxVARS that renames the values of the variables to take on the first three letters of the variable name plus the variable value applied as a suffix at the end (e.g., YxxSEX has values of 1 and 2. YxxVARS now has values of SEX1 and SEX2).

Step 5c: Create an individual dataset (TEMP10) with a new variable YxxVARS that has a value of TOTAL.

Step 6: Create a principal count file (YxxM3IN1) by concatenating the ten temporary files in alphabetical order.

Step 7: Perform a PROC CONTENTS and PROC PRINT on YxxM3IN1 file.

8.1.2 Macro Program: D#MSQ.@MSQ00M3.PGMLIB99(SYSM302)

Input Files:	D#MSQ.@MSQ0000.SAS.YXXM1003.M1CNTSxx
	D#MSQ.@MSQ0000.SAS.YXXM3001.YxxM3IN1
	D#MSQ.@MSQ0000.SAS.YXXM1006.M1CNTSxx
	D#MSQ.@MSQ0000.SAS.YXXM1004.AGESEX99
Output Files:	D#MSQ.@MSQ0000.SAS.YXXM3002.YxxM3RAS

Purpose: Macro call to the program YXXM3002. This macro passes the YEAR parameter (as defined in M3POSTxx) on to M3GENERL and YXXM3002.

8.1.3 Program: D#MSQ.@MSQ00M3.PGMLIB99(M3GENERL)

Purpose: This macro creates a table shell with one row for each analytical subgroup and as many columns as the number of different values of the variable VARNAME (for example for VARNAME = SPG the table will have 95 columns). It is designed to set to 0 all missing VARNAME counter/rate values.

Program Steps:

Step 1: Read in the M1CNTSxx files (Denominator counts files from M1). Sort by YXXVARS and delete duplicates for preparation of a table shell.

Step 2: Create file INI13 that takes the YxxVARS that are in rows and lays them out into columns. Write out variables into one row. Perform a PROC PRINT of INI13.

Step 3: Create table shell (temporary dataset SHELL).

Step 4: PROC SORT SHELL by VARS (YxxVARS) and within VARS by VARNAME (VARNAME will be SPGs).

8.1.3.1 Called Program: D#MSQ.@MSQ00M3.PGMLIB99(YXXM3002)

Purpose: Create a SAS file with age/sex adjusted rates of admissions by SPG and subgroups.

Program Steps:

Step 1: Input counters from the file YxxM3IN1 and write them out to 3 files: one file for age groups (INI2A), one file for sex groupings (INI2S), and one for all the other groups (INI2). A fourth file (ERR1) is created to write out counters where age or sex is missing as a quality check. There should be no observations in this file. Perform a PROC PRINT on ERR1.

Step 1a: Sort the three files by appropriate variables to eventually perform merges to construct rates.

Step 2: Create ASWGT99 (age/sex weight). Write out 3 weight files: age/sex (WGTA_S), age (WGT_A), and sex (WGT_S) from the AGESEX99 file created in M1. Perform a PROC PRINT on the three files.

Step 3: Create age/sex adjusted rates for all subgroups except age and sex.

Step 3a: Input counters from the Denominator File created in M1.

Step 3b: In order to construct the unadjusted rates per 1,000 beneficiaries for each age/sex cell, merge the INI2 temporary file to the Denominator temporary count file INI3. Create the unadjusted rate per 1,000 beneficiaries (YxxRSPG) and output to TEMP1. Create the file ERR2 for observations in INI2 file and not in Denominator counter file (INI3). Perform a PROC PRINT on ERR2.

Step 3c: Add a new variable (YxxASSPG) - the age/sex adjusted SPG rate - and output to TEMP2. Create ERR3 file that has observations that have no weight in the Denominator File. Perform a PROC PRINT on ERR3.

Step 3d: Sum the above rate (YxxASSPG) by YxxVARS, YxxSPG, and YEAR and output to FINAL.

Step 4: Create sex adjusted rates for age subgroups.

Step 4a: Sum the Denominator File counters to adjust age groups by sex and write out to INI3A.

Step 4b: Create unadjusted rates per 1,000 beneficiaries (YxxRSPG) and output to TEMP1A.

Step 4c: Adjust rates by the 1999 sex weights (YxxASSPG) and output to TEMP2A.

Step 4d: Sum the above rate (YxxASSPG) by YxxVARS, YxxSPG, and YEAR and output to FINALA.

Step 5: Create age adjusted rates for sex subgroups.

Step 5a: Sum the Denominator File counters to adjust sex groups by age and write out to INI3S.

Step 5b: Create unadjusted rates per 1,000 beneficiaries (YxxRSPG) and output to TEMP1S.

Step 5c: Adjust rates by the 1999 age weights (YxxASSPG) and output to TEMP2S.

Step 5d: Sum the above rate (YxxASSPG) by YxxVARS, YxxSPG, and YEAR and output to FINALS.

Step 6: Create ALLS that puts all the rates (FINAL, FINALA, and FINALS) together in one file.

Step 7: Merge ALLS and the table shell from M3GENERL (SHELL) by YxxVARS and YxxSPG and output to YxxM3RAS. Values in SHELL that do not have a match to ALLS are set to 0. Values in ALLS that do not have a slot in SHELL are output to ERR4. Perform a PROC PRINT on ERR2. Perform a PROC CONTENTS and PROC PRINT on YxxM3RAS.

8.1.5 Macro Program: D#MSQ.@MSQ00M3.PGMLIB99 (SYSM303)

Input Files :	D#MSQ.@MSQ0000.SAS.YXXM1003.M1CNTSxx
	D#MSQ.@MSQ0000.SAS.YXXM3001.YxxM3IN1
	D#MSQ.@MSQ0000.SAS.YXXM1004.AGESEX99
	D#MSQ.@MSQ0000.SAS.YXXM1006.M1CNTSxx
Output Files:	D#MSQ.@MSQ0000.SAS.YXXM3003.YxxM3ART

Purpose: Macro call to the program YXXM3003. This macro passes the YEAR parameter (as defined in M3POSTxx) on to M3GENERL and YXXM3003.

8.1.6 Called Program: D#MSQ.@MSQ00M3.PGMLIB99(M3GENERL)

Purpose and Program Steps: See explanation under section 8.1.3.

8.1.5.1 Called Program: D#MSQ.@MSQ00M3.PGMLIB99(YXXM3003)

Purpose: Create a SAS file with age adjusted rates of admissions by SPG and subgroups.

Program Steps:

Step 1: Input counters from the file YxxM3IN1 and write them out to INI2. A second file (ERR1) is created to write out counters where age or sex is missing as a quality check. There should be no observations in this file. Perform a PROC PRINT on ERR1.

Step 2: Sum the count variable (YxxNSPG) by YxxFAGE, YxxVARS, YxxSPG, and YEAR and output to INI21.

Step 3: Sum the Denominator File counters by age group and YxxVARS in preparation for the creation of age weights and write out to INI31.

Step 4: Create AWGT99 (age weight). Write out an age weight file WGTA. Perform a PROC PRINT on WGTA.

Step 5: In order to construct the unadjusted rates per 1,000 beneficiaries for each age cell, merge the INI21 temporary file to the Denominator temporary count file INI31. Create the unadjusted rate per 1,000 beneficiaries (YxxRSPG) and output to TEMP1. ERR2 file created for observations in INI21 file and not in Denominator counter file (INI31). Perform a PROC PRINT on ERR2.

Step 6: Add a new variable (YxxAASPG) - the age adjusted SPG rate - and output to TEMP2. Age group rates remain unadjusted. Create the file ERR3 that has observations that have no weight in the Denominator File. Perform a PROC PRINT on ERR3.

Step 7: Sum the above rate (YxxAASPG) by YxxVARS, YxxSPG, and YEAR and output to FINAL.

Step 8: Merge FINAL and the table shell from M3GENERL (SHELL) by YxxVARS and YxxSPG and output to YxxM3ART. Values in SHELL that do not have a match to FINAL are set to 0. Values in FINAL that do not have a slot in SHELL are output to ERR4.

Perform a PROC PRINT on ERR4. Perform a PROC PRINT and PROC CONTENTS on YxxM3ART.

8.1.7 Macro Program: D#MSQ.@MSQ00M3.PGMLIB99 (SYSM304)

Input Files:	D#MSQ.@MSQ0000.SAS.YXXM1003.M1CNTSxx
	D#MSQ.@MSQ0000.SAS.YXXM3001.YxxM3IN
Output Files:	D#MSQ.@MSQ0000.SAS.YXXM3004.YxxM3CNT
	D#MSQ.@MSQ0000.SAS.YXXM3004.YxxM3URT

Purpose: Macro call to program YXXM3004 and passes the YEAR parameter (as defined in M3POSTxx) on to M3GENERL and YXXM3004.

8.1.8 Program: D#MSQ.@MSQ00M3.PGMLIB99 (M3GENERL)

Purpose and Program Steps: See explanation under section 8.1.3.

8.1.7.1 Called Program: D#MSQ.@MSQ00M3.PGMLIB99 (YXXM3004)

Purpose: Create two SAS files, one with counters and the other with unadjusted rates of admissions by SPG and subgroups.

Program Steps:

Step 1: Input counters from file YxxM3IN1 and write them out to INI2. A second file (ERR1) is created to write out counters where age or sex is missing as a quality check. There should be no observations in this file. Perform a PROC PRINT on ERR1.

Step 2: Sum the count variable (YxxNSPG) by YxxVARS, YxxSPG, and YEAR and output to INI21.

Step 3: Merge INI21 and the table shell from M3GENERL (SHELL) by YxxVARS and YXXSPG and output to YxxM3CNT. Values in SHELL that do not have a match to INI21 are set to 0. Values in INI21 that do not have a slot in SHELL are output to ERR2. Perform a PROC PRINT on ERR2. Perform a PROC PRINT and PROC CONTENTS on YxxM3CNT.

Step 4: To construct the unadjusted rates per 1,000 beneficiaries for each cell, merge the YxxM3CNT file to the Denominator count file M1CNTSxx. Create the unadjusted rate per 1,000 beneficiaries (YxxRSPG) and output to YxxM3URT. Create the file ERR3 for observations in Denominator counter file (M1CNTSxx) that are not in YxxM3CNT. Create the file ERR4 for observations in YxxM3CNT file that are not in M1CNTSxx. Perform a PROC PRINT on ERR3 and ERR4. Perform a PROC PRINT and PROC CONTENTS on YxxM3URT.

8.1.9 Macro Program: D#MSQ.@MSQ00M3.PGMLIB99 (SYSM305)

Input Files: D#MSQ.@MSQ0000.SAS.YXXM3002.YxxM3RAS
D#MSQ.@MSQ0000.SAS.YXXM3003.YxxM3ART
D#MSQ.@MSQ0000.SAS.YXXM3004.YxxM3CNT
D#MSQ.@MSQ0000.SAS.YXXM3004.YxxM3URT

Output Files: D#MSQ.@MSQ0000.SAS.YXXM3005.YxxM3RAS.XPT
D#MSQ.@MSQ0000.SAS.YXXM3005.YxxM3ART.XPT
D#MSQ.@MSQ0000.SAS.YXXM3005.YxxM3CNT.XPT
D#MSQ.@MSQ0000.SAS.YXXM3005.YxxM3URT.XPT

Purpose: Macro call to the program YXXM3005. This macro passes the YEAR parameter (as defined in M3POSTxx) on to YXXM3005.

8.1.9.1 Called Program: D#MSQ.@MSQ00M3.PGMLIB99 (YXXM3005)

Purpose: Transpose data for input into tables. Create SAS transport files to download to a PC.

Program Steps:

Step 1: Transpose the input datasets to have the subgroups in rows and the counts or rates as columns.

Step 2: Create SAS transport files.

8.1.10 Macro Program: D#MSQ.@MSQ00M3.PGMLIB99 (SYSM306)

Input Files: D#MSQ.@MSQ0000.SAS.YXXM3005.YxxM3RAS.XPT
D#MSQ.@MSQ0000.SAS.YXXM3005.YxxM3ART.XPT
D#MSQ.@MSQ0000.SAS.YXXM3005.YxxM3CNT.XPT
D#MSQ.@MSQ0000.SAS.YXXM3005.YxxM3URT.XPT

Output Files: D#MSQ.@MSQ0000.SAS.YXXM3006.RTFRASxx
D#MSQ.@MSQ0000.SAS.YXXM3006.RTFARTxx
D#MSQ.@MSQ0000.SAS.YXXM3006.RTFCNTxx
D#MSQ.@MSQ0000.SAS.YXXM3006.RTFURTxx

Purpose: Macro call to the program YXXM3006. This macro passes the YEAR parameter (as defined in M3POSTxx) on to YXXM3006.

8.1.10.1 Called Program: D#MSQ.@MSQ00M3.PGMLIB99 (YXXM3006)

Purpose: Create .RTF files from the transport files to be read into Microsoft Word.

Program Steps:

Step 1: Replace YxxVARS values with descriptive label-like values to be used in tables.

Step 2: Create a do loop that reads through the 4 transport files. Read in SAS transport file and copy it into a standard SAS file. Print these files and save them as .RTF files.

CHAPTER III

METHODS, FLOWCHARTS, AND

SPECIFICATIONS FOR

ACUTE MYOCARDIAL INFARCTION,

HEART FAILURE, AND STROKE

PART I: METHODS

1. A NOTE ON CODING

The programs presented below comprise the coding for three measures/clinical priority areas: Acute Myocardial Infarction (AMI), Heart Failure, and Stroke. The programs are run for different measures by specifying the relevant clinical cohort ("CC") (defined in part 2. below).

2. DESCRIPTION OF THE MEASURE

The hospital utilization measures presented in the Acute Myocardial Infarction, Heart Failure, and Stroke reports include the following measures:

- M4 - Discharge numbers and rates, length of stay, Medicare payments, beneficiary deductibles and coinsurance payments
- M5 - Readmission rates and days to readmission
- M6 - Mortality rates and days to death

Clinical cohorts: There are 13 clinical cohort/condition ("CC") groups that belong to 4 Clinical Priority Areas as follows (In parentheses are the 2- or 3- character abbreviations for CCs in programming):

Heart Failure

- 1) Principal diagnosis of heart failure (HF)

Stroke

- 2) Principal diagnosis of stroke or TIA (IS1)
- 3) Principal diagnosis of stroke only (IS2)
- 4) Principal or secondary diagnosis of atrial fibrillation (IS3)
- 5) Any procedure code indicating carotid endarterectomy (IS4)

Pneumonia³

- 6) Principal diagnosis of viral pneumonia (PN1)
- 7) Principal diagnosis of pneumococcal pneumonia (PN2)

³ Please note that pneumonia measures were not produced in Edition 1 of MQMS.

- 8) Principal diagnosis of other bacterial pneumonia (PN3)
- 9) Principal diagnosis of unspecified pneumonia (PN4)
- 10) Principal diagnosis of influenza with pneumonia (PN5)
- 11) Principal diagnosis of septicemia and a secondary diagnosis of pneumonia (PN6)
- 12) Principal diagnosis of acute respiratory failure and a secondary diagnosis of pneumonia (PN7)

Acute Myocardial Infarction

- 13) Principal diagnosis of acute myocardial infarction (MI)

Table Production: The following tables are produced for each clinical cohort as the basis for reporting on each condition. For each table, the hospital utilization measures are presented by beneficiary's demographic and geographic characteristics. The tables with an asterisk (*) present measures that are presented by provider state and region rather than by beneficiary location. Numerator and denominator events/populations are also described.

	Title	Numerator	Denominator
1	Unadjusted Total Number of Discharges with a Principal Diagnosis of CC, 1992-2001	Discharges with a Principal Diagnosis of CC	None
2	Unadjusted Total Number of Beneficiaries Discharged with CC, 1992-2001	Beneficiaries Discharged with CC	None
3	Comparison of Beneficiaries Hospitalized for CC with the Entire MQMS Fee-For-Service Medicare Population, 1992 and 2001	Note: Created from other existing tables.	
4	Age-Sex Adjusted Rates of Discharges for CC per 1,000 Beneficiaries, 1992-2001	Discharges with a Principal Diagnosis of CC	Medicare FFS beneficiaries enrolled for the entire year (M1-4 cohort)
5	Age-Sex Adjusted Rate of Beneficiaries Discharged for CC per 1,000 Beneficiaries, 1992-2001	Beneficiaries Discharged with CC	Medicare FFS beneficiaries enrolled for the entire year (M1-4 cohort)
6	Age-Sex Adjusted Average Length of Stay for CC Hospitalizations, 1992-2001*	Length of Stay for CC Hospitalizations	Discharges with a diagnosis of CC
7	Total Medicare Payments for Discharges for CC, 1992-2001*	Medicare Payments for Discharges for CC	None.
8	Average Medicare Payments per CC Discharge, 1992-2001*	Medicare Payments for Discharges for CC	Discharges with a diagnosis of CC

	Title	Numerator	Denominator
9	Total Beneficiary Deductible and Coinsurance Payments for CC Discharges, 1992-2001	Beneficiary Deductible and Coinsurance Payments for CC Discharges	None.
10	Average number of clinical condition discharges per beneficiary discharged with CC, 1992-2001*	CC discharges	Beneficiaries with a diagnosis of CC
11	Average number of all discharges per beneficiary discharged with CC, 1992-2001*	All discharges	Beneficiaries with a diagnosis of CC
12	Age-Sex Adjusted All-Cause Readmission Rate per 1,000 Beneficiaries Discharged with a Principal Diagnosis of CC, within 2, 7, 30, 180, 365, and 730 days from discharge, 1992-2001*	Hospital readmissions for any cause within 2, 7, 30, 180, 365, and 730 days from discharge	Beneficiaries with a diagnosis of CC
13	Age-Sex Adjusted All-Cause Readmission Rate per 1,000 Discharges with a Principal Diagnosis of CC, within 2, 7, 30, 180, 365, and 730 days from discharge, 1992-2001*	Hospital readmissions for any cause within 2, 7, 30, 180, 365, and 730 days from discharge	Discharges with a diagnosis of CC
14	Age-Sex Adjusted CC Readmission Rate per 1,000 Beneficiaries Discharged with a Principal Diagnosis of CC, within 2, 7, 30, 180, 365, and 730 days from discharge, 1992-2001*	Hospital readmissions for CC within 2, 7, 30, 180, 365, and 730 days from discharge	Beneficiaries with a diagnosis of CC
15	Age-Sex Adjusted CC Readmission Rate per 1,000 Discharges with a Principal Diagnosis of CC, within 2, 7, 30, 180, 365, and 730 days from discharge, 1992-2001*	Hospital readmissions for CC within 2, 7, 30, 180, 365, and 730 days from discharge	Discharges with a diagnosis of CC
16	Age-Sex Adjusted Mortality Rate per 1,000 Beneficiaries Hospitalized for CC, within the hospital stay, and within 2, 30, 180, 365, and 730 days from admission, 1992-2001*	Deaths within 2, 7, 30, 180, 365, and 730 days from admission	Beneficiaries with a diagnosis of CC
17	Age-Sex Adjusted Mortality Rate per 1,000 Beneficiaries Hospitalized for CC, within the hospital stay, and within 2, 30, 180, 365, and 730 days from admission, 1992-2001*	Deaths within 2, 7, 30, 180, 365, and 730 days from admission	Discharges with a diagnosis of CC

2. CMS DATA SOURCES:

- **MedPAR File:** The 1992-2001 MedPAR claims files produced for the M2 measures (M2 Base Analytic Claims File) which provide hospital discharge data for beneficiaries included in the MQMS.
- **Denominator File:** The 1992-2001 Base Analytic Denominator files produced during the M1 process containing the number of Medicare Part A FFS enrollees included in the MQMS, in total, and by subgroups of interest, i.e., stratifiers.

- **CMS Cross-Reference File:** The 1992-2001 Cross-Reference files for beneficiaries with a MedPAR claims in the respective year. These files have the listings of all Medicare beneficiary identification numbers (historical IDs) under which the beneficiary has been entitled to receive Medicare benefits. These files allow one to link across multiple identification numbers and to establish a unique number for each Medicare beneficiary.
- The 1999 MQMS M1 Count file (M1CNTS99) which provides the number of Medicare FFS Part A Enrollees - both M1-3 (enrolled on July 1) and M1-4 enrolled for the entire 12 months) cohorts - included in the MQMS, in total, and by age and sex. The 1999 file serves as the standard Medicare population file used for the age/sex adjustment of MQMS outcome measures.

3. INCLUSION CRITERIA

The MedPAR discharge records are included in each of the clinical cohorts if they meet all of the following criteria:

- Discharge is a short-stay acute care hospital claim
- Discharge record is not a duplicate entry in the MedPAR file
- Beneficiary belongs to the MQMS M13/M14 Base Analytic Denominator File
- Discharges in the HCQIP clinical priority areas identified through ICD-9-CM diagnosis and procedure codes.

4. EXCLUSION CRITERIA

Claimants are excluded if they meet any of the following conditions.

- Claimants residing outside of the United States, except claimants residing in Puerto Rico, Guam, and the Virgin Islands. Residents of Guam are included with Hawaii residents.
- Claimants with invalid values for date of birth, state code, sex, race, and Medicare status code.

5. DEFINITION OF STRATIFIERS

Given below are definitions of key variables used as stratifiers by which quality measure outcomes are reported.

- **Age Group:** The following nine age groupings are used in formatting age and in conducting age/sex adjustments to rates with the following exceptions: for

age/sex adjustments to rates by states, 4 age groups were used - <65, 65-74, 75-84, 85+; and for rates by Medicare status.

- 1 = 0-54
- 2 = 55-64
- 3 = 65-69
- 4 = 70-74
- 5 = 75-79
- 6 = 80-84
- 7 = 85-89
- 8 = 90-94
- 9 = 95+

- Sex: Gender of Beneficiary
 - 1 = Male
 - 2 = Female
- Race: Race of Beneficiary
 - 1 = White
 - 2 = African American
 - 3 = Other (Asian, Hispanic, North American Native, Other)
 - 0 = Unknown
- Dual Flag: A dichotomous variable that identifies beneficiaries that are dually enrolled in Medicare Part A and Medicaid at least one month during the calendar year, defined as the member being enrolled in Medicare Part A and with Medicaid buy-in at least one month during the calendar year.
 - 1 = Medicare and Medicaid dual enrollment
 - 0 = Not enrolled in Medicaid
- Medicare Eligibility Status: Original reason for Medicare eligibility
 - 1 = Aged without ESRD
 - 2 = Disabled without ESRD
 - 3 = ESRD only
- Urban/Rural: A dichotomous variable defining beneficiary county of residence as an urban or rural location. All counties residing within a Metropolitan Statistical Area (MSA) are designated as urban areas.
 - 1 = Urban Area
 - 0 = Rural Area
- Census Region: Beneficiary Census Region of residence as of March 31st of the year following the reference year. Note that the Denominator File is created in

April for the previous calendar year. The March update of the EDB is used to populate the fields for the previous year's Denominator File.

0 = Puerto Rico and Virgin Islands

1 = Northeast

2 = Midwest

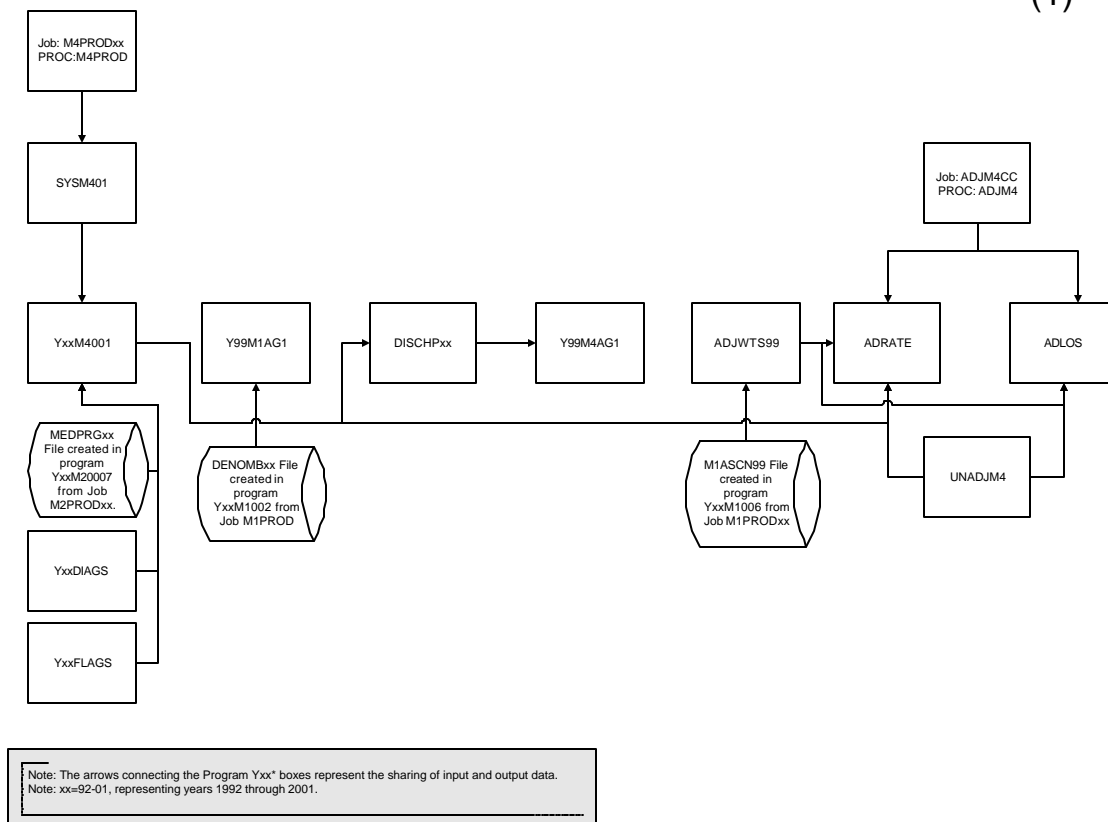
3 = South

4 = West

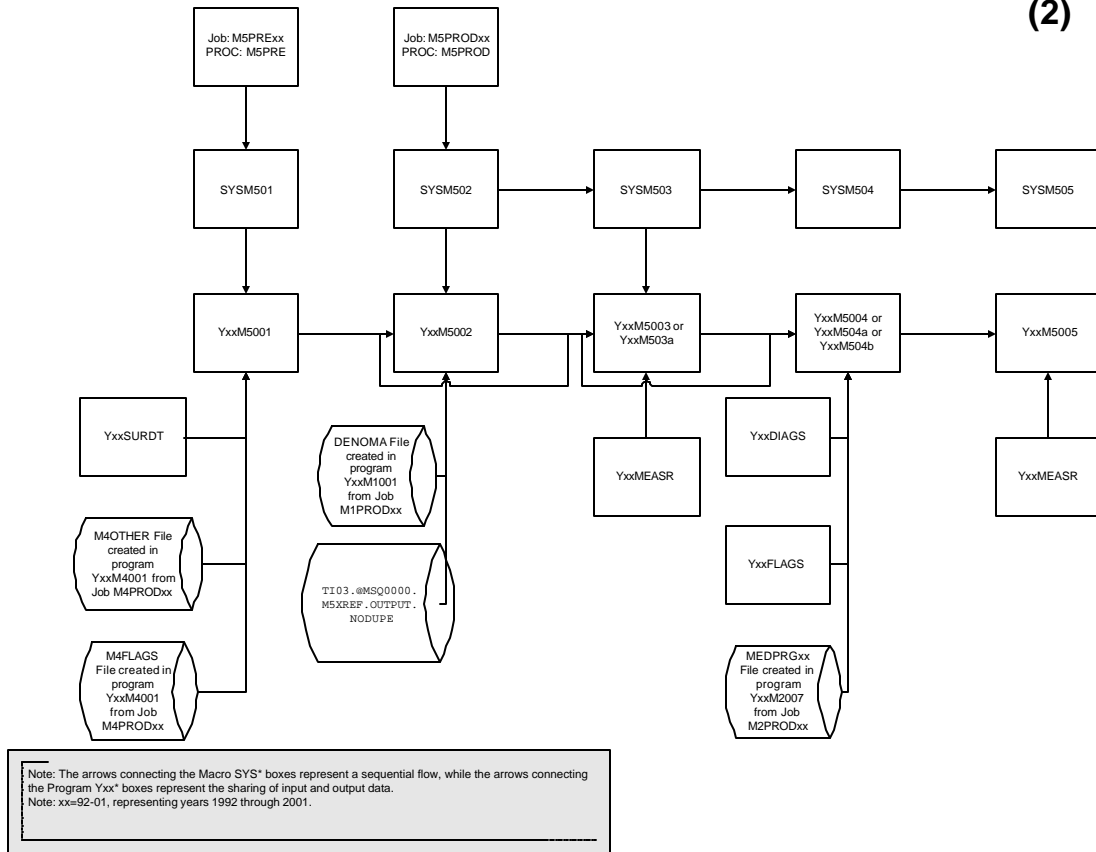
- State: Beneficiary state of residence as of March 31st of the year following the reference year. Note that the Denominator File is created in April for the previous calendar year. The March update of the EDB is used to populate the fields for the previous year's Denominator File. Residents of Guam are reported with residents of Hawaii. Residents of Puerto and Virgin Islands are reported together.
- Provider State: State in which the provider hospital is located where beneficiary was hospitalized. Hawaii and Guam are combined, and Puerto, Virgin Islands, and Canada are combined.
- Provider region: Census region of the provider state.

PART II: FLOWCHARTS

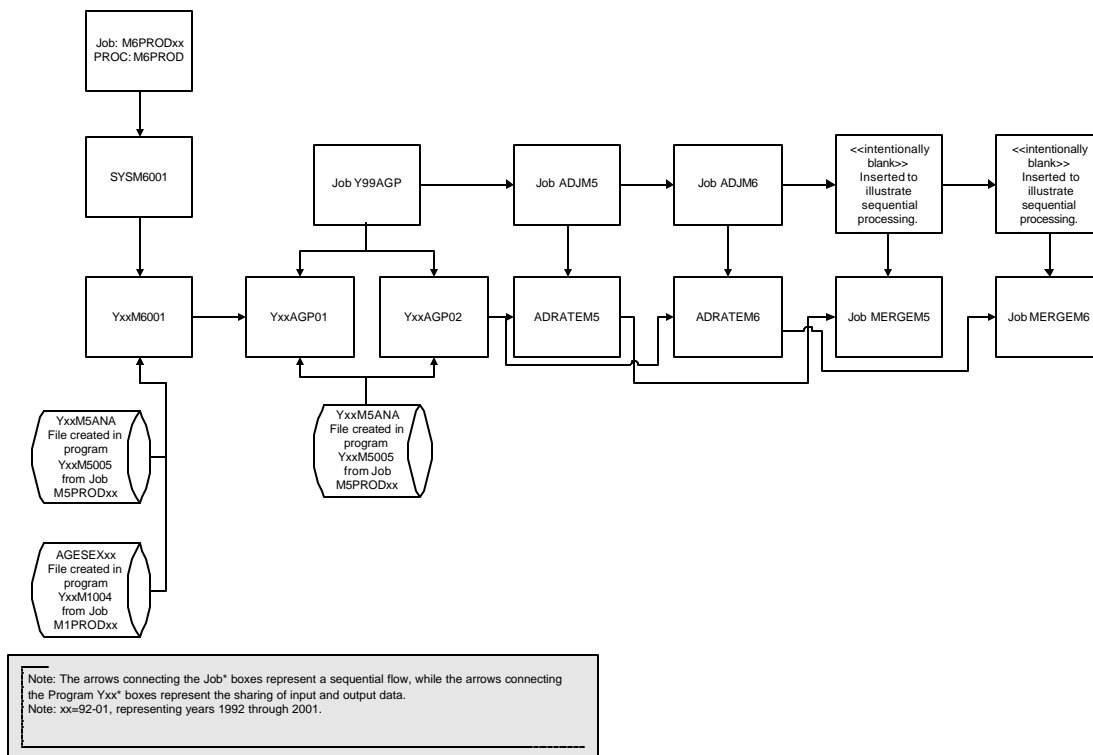
(1)



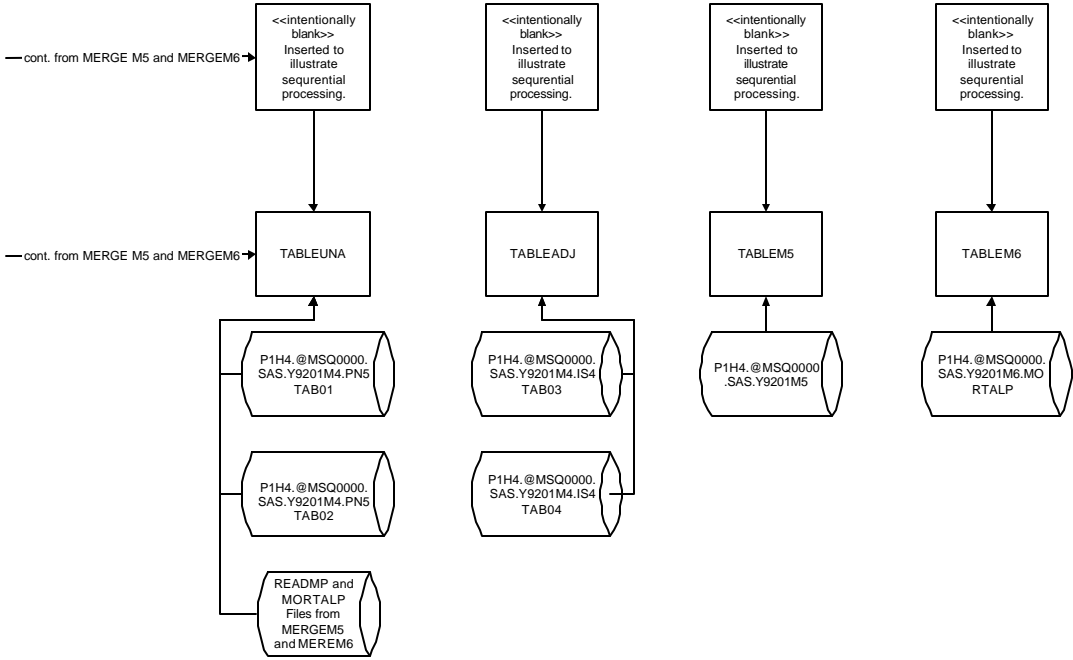
(2)



(3)



(4)



PART III: DATA PROCESSING

A NOTE ON CODING

The programs presented below comprise the coding for three measures/clinical priority areas: Acute Myocardial Infarction (AMI), Heart Failure, and Stroke. The programs are run for different measures by specifying the relevant clinical cohort ("CC").

1. PRODUCTION JCL: D#MSQ.@MSQ00M4.PGMLIBxx (M4PRODxx)

Purpose: This job executes the cataloged procedure M4PROD for a specified year (where xx=92-01). To run this job for other years, simply define the year of analysis in the YEAR parameter (2 digit year). The year parameter is passed on to M4PROD (the called cataloged procedure), which then passes it on to all the subsequent macro and SAS programs. All programs from this point forward are run based on the execution of this production JCL.

1.1 Catalogued Procedure: D#MSQ.@MSQ00M4.PGMLIB99 (M4PROD)

Purpose: This is a cataloged procedure with one step. The procedure executes a SAS macro call (named SYSM401), which in turn executes a corresponding macro program (YXXM4001). The YEAR parameter defined in the production JCL M4PRODxx is passed onto this program, defining the year to which all subsequent programs will be executed.

1.1.1 Macro Program: D#MSQ.@MSQ00M4.PGMLIB99 (SYSM401)

Input data: D#MSQ.@MSQ0000.SAS.YxxM2007.MEDPRGxx
Output data: D#MSQ.@MSQ0000.SAS.YxxM4001.M4FLAGS
D#MSQ.@MSQ0000.SAS.YxxM4001.M4OTHER
D#MSQ.@MSQ0000.SAS.YxxM4001.DISCHxx

Purpose: Macro call to program YXXM4001. This macro passes the YEAR parameter (as defined in M4PRODX) on to YXXM4001.

1.1.1.1 Called Program: D#MSQ.@MSQ00M4.PGMLIB99 (YxxM4001)
D#MSQ.@MSQ00M4.PGMLIB99 (YxxDIAGS)
D#MSQ.@MSQ00M4.PGMLIB99 (YXXFLAGS)

Purpose: Construct M4 analytic files: From MedPAR file, identify discharges that fall into 13 Clinical Cohort groups and create analytic variables to be used for quality measures. **Please note that the "XX" in the program name YXXFLAGS is not an abbreviation for a series of years. The program is actually named YXXFLAGS.**

Program Steps:

Step 1: Each discharge record in the Base Analytic MedPAR File created from the M2 process is checked and flagged if the discharge diagnosis falls into one of the 13 clinical cohorts based on ICD-9-CM codes.

Step 2: Discharge records are subsequently separated into 2 files: 'M4FLAGS' file containing the 13 clinical cohort discharges and M4OTHER containing non-cohort discharges.

Step 3: M4FLAGS file is further processed to create M4 analytic variables.

Step 4: The resulting DISCHxx file contains discharge level analytic variables for the 13 clinical cohorts.

2. PRODUCTION JCL: <<intentionally blank >>

2.1 Catalogued Procedure: <<intentionally blank>>

Input data: D#MSQ.@MSQ0000.SAS.YxxM1002.DENOMBxx
Output data: D#MSQ.@MSQ0000.SAS.YxxM1AG1.M13BENE
D#MSQ.@MSQ0000.SAS.YxxM1AG1.M14BENE

Purpose: A catalogued procedure that calls the SAS program YxxM1AG1.

2.1.1 Called Program: D#MSQ.@MSQ00M1.PGMLIBAG(YxxM1AG1)

Purpose: Create aggregate denominator files containing Medicare FFS beneficiary counts for 2 cohorts: M1-3 and M1-4 by stratifiers (i.e., age, sex, race, dual, Medicare status, urban/rural, and beneficiary state and region).

Program Steps:

Step 1: Create a set of aggregate data files for each year that contain the aggregate beneficiary population files are created to contain all Medicare FFS beneficiary counts for 2 cohorts, M1-3 and M1-4, by stratifiers (i.e., age, sex, race, dual eligibility, Medicare status, urban/rural, and beneficiary state and region. The counts of beneficiaries are used as denominators for computing discharge rates per 1,000 beneficiaries.

2.2 Catalogued Procedure: <<intentionally blank>>

Input data: D#MSQ.@MSQ0000.SAS.YxxM4001.DISCHxx
D#MSQ.@MSQ0000.SAS.YxxM4001.FLAGS
Output data: P1H4.@MSQ0000.SAS.YxxM4001.DISCHPxx
P1H4.@MSQ0000.SAS.YxxM4AG1.M4ccAG

Purpose: A catalogued procedure that calls the SAS program YxxM4AG1. **Please note that the “cc” in the output dataset named P1H4.@MSQ0000.SAS.YxxM4AG1.M4ccAG is an abbreviation for the clinical cohorts described above on page 77.**

2.2.1 Called Program: P1H4.@MSQ00AG.PGMLIB(DISCHPxx) P1H4.@MSQ00AG.PGMLIB(Y99M4AG1)

Purpose: Create aggregate M4 discharge data files for clinical groups separately by stratifiers and provider location variables.

Program Steps:

Step 1: Create a set of aggregate data files for each year that contain data for M4 measures by stratifiers. The files are created separately for individual CC groups. Discharge information includes aggregate counts of discharge (or beneficiaries), length of stays, Medicare payment amounts, and deductible and coinsurance amounts. Provider location variables (state and region) are added to the aggregate file by merging with 'FLAGS' file containing provider id.

3. PRODUCTION JCL: <<intentionally blank>>**3.1 Catalogued Procedure:** <<intentionally blank>>

Input data:

D#MSQ.@MSQ0000.SAS.Y99M1006.M1CNTS99(M1ASCN99)

Output data:

P1H4.@MSQ0000.SAS.Y99M1.ADJWTS99

Purpose: A catalogued procedure that calls the SAS program ADJWTS99.

3.1.1 Called Program: P1H4.@MSQ00M4.PGMLIB(ADJWTS99)

Purpose: Create a standard population (1999 population) file containing age, sex, and age/sex proportions or weights (18 age/sex grouping as well as 8 age/sex grouping).

Program Steps:

Step 1: Using the 1999 Medicare FFS enrollees as the standard population, a file is created that contains adjustment weights for 9 age categories, 2 sex categories, and 18 age/sex groupings as well as for 4 age and 8 age/sex groupings. This file is later used in the direct standardization procedures.

4. PRODUCTION JCL: P1H4 .@MSQ00AG .PGMLIB(ADJM4cc)

4.1 Catalogued Procedure: P1H4 .@MSQ00AG .PGMLIB(ADJM4)

Input data:	P1H4 .@MSQ0000 .SAS .YxxM4AG1 .M4ccAG D#MSQ .@MSQ0000 .SAS .YxxM1AG1 .M14BENE P1H4 .@MSQ0000 .SAS .Y99M1 .ADJWTS99
Output data:	P1H4 .@MSQ0000 .SAS .Y9201M4 .ccTAB01 P1H4 .@MSQ0000 .SAS .Y9201M4 .ccTAB02 P1H4 .@MSQ0000 .SAS .Y9201M4 .ccTAB03 P1H4 .@MSQ0000 .SAS .Y9201M4 .ccTAB04

Purpose: A catalogued procedure that calls the SAS program ADJM4cc. Please note that in all cases, “cc” in program or dataset names is an abbreviation for the clinical cohorts listed on page 77.

4.1. Called Program:

```
P1H4 .@MSQ00AG .PGMLIB(UNADJR)
P1H4 .@MSQ00AG .PGMLIB(ADRATE)
P1H4 .@MSQ00AG .PGMLIB(ADLOS)
```

Purpose: Produce M4 measures:

- 1) Produce unadjusted outcome measures by stratifier
- 2) Perform the age/sex adjustment procedures and produce adjusted outcome measures
- 3) Set rates based on small numbers to missing
- 4) Combine multiple years' data

Program Steps:

Step 1: There are four types of indicators for M4 measures: discharge counts, length of stay, Medicare payments, and beneficiary deductibles and coinsurance payments. These are computed and presented in three statistical summary measures:

- 1) Sum – number of discharges, total Medicare payments, and total beneficiary deductibles and coinsurance payments. “Sum” measures are computed by summing the aggregate counts or payment amounts for each demographic and geographic subgroup.
- 2) Rate – discharge rates. “Rates” are computed by dividing the sum of numerator counts by the sum of denominator counts for each subgroup.

- 3) Average – length of stay per discharge, Medicare payments per discharge, number of cc discharges per beneficiary, and number of all discharges per beneficiary. “Averages” are computed by the sum of numerator values by the sum of discharge counts (or beneficiary counts) for each subgroup.

Step 2: Age/sex adjustment (i.e., standardization to the age/sex distribution of the 1999 M1-3 population) is performed for discharges rates and average length of stay (LOS). National-level results are standardized with 18 age/sex groups using direct standardization. State-level results are standardized using indirect standardization, due to smaller sample sizes.

- Direct standardization is accomplished as follows:
 - 1) Read in the standard population age, sex, and age/sex adjustment weights for 9 age, 2 sex, and 18 age by sex groupings.
 - 2) Calculate unadjusted rates, in total, and by stratifying variables within the 18 age/sex standardization cells.
 - 3) Calculate age/sex adjusted rates (or average LOS), in total, and by stratifying variables (for race, dual eligibility, Medicare eligibility status, urban/rural, beneficiary region) by multiplying the unadjusted rates by the 18 age/sex adjustment weights and summing across the 18 age/sex cells. Age-specific measures are adjusted with 2 sex-adjustment weights, and sex-specific measures adjusted with 9 age-adjustment weights. (To accomplish this, a proc summary matrix was used to selectively obtain the desired cross-tabulation values.) Outcome measures by Medicare eligibility status were further “fixed” to correct for age-dependent eligibility status.
- Indirect standardization is accomplished as follows:
 - 1) Compute national total and 18 age by sex group rates (numerator events divided by Denominator counts) for the standard year, i.e., 1999.
 - 2) For each analysis year, obtain observed number of numerator events (O) by state. Compute expected number of events (E) by multiplying the age/sex standard rates with the denominator counts for each age by sex by state cell and summing up for each state.
 - 3) Divide O by E and then multiply this ratio to the 1999 national standard rate to get the indirectly standardized state rates.

Step 3: Once all unadjusted and adjusted statistical measures are computed, those measures that are based on 25 or less numerator counts are flagged to be replaced by a missing value (.).

Step 5: All of the above statistical measures are computed for a given year and then merged across the years, i.e., 1992 to 2001.

5. PRODUCTION JCL: D#MSQ.@MSQ00M5.PGMLIBxx (M5PRExx)

Purpose: This job executes the cataloged procedure M5PRE for a specified year (e.g., M5PRE92 for 1992). To run this job for other years, simply define the year of analysis in the YEAR parameter (2 digit year). The year parameter is passed on to M5PRE (the called catalogued procedure), which then passes it on to all the subsequent macro and SAS programs. All programs from this point forward are run based on the execution of this production JCL.

Using the M4 files (M4FLAGS and M4OTHER), the M5 Base Hospital Discharge Analysis File is constructed to measure readmissions (M5) and deaths (M6) following hospital discharge or surgery for 8 of the 13 clinical cohorts (Clinical cohorts 1,2,4,5,6,11,12, and 13). Readmissions and deaths are captured for different time periods following the index (or target) hospital event at the discharge level and beneficiary level. Readmissions are further measured for two different causes, readmission due to all causes and readmission due to the clinical condition of interest. Because readmissions and deaths are measured up to 2 years from the index event, 3-years of data are processed for a given index year (the exceptions are the latest index years for which there are no 2- or 1-follow-up year(s) available). We describe the data processing steps below.

5.1 Catalogued Procedure: D#MSQ.@MSQ00M5.PGMLIB99 (M5PRE)

This is a cataloged procedure with one step. The procedure executes a SAS macro call (named SYSM501), which in turn executes a corresponding macro program (YXXM5001). The YEAR parameter defined in the production JCL M5PRExx is passed onto this program, defining the year to which all subsequent programs will be executed.

5.1.1 Macro Program: D#MSQ.@MSQ00M5.PGMLIB99 (M5PRE)

Input data:	D#MSQ.@MSQ0000.SAS.YxxM4001.M4FLAGS D#MSQ.@MSQ0000.SAS.YxxM4001.M4OTHER
Output data:	D#MSQ.@MSQ0000.SAS.YxxM5001.YxxM5IN1 D#MSQ.@MSQ0000.FLAT.YxxM5001.YxxFNDR D#MSQ.@MSQ0000.SAS.YxxM5001.SDERRS

Purpose: Macro call to program YXXM5001. This macro passes the YEAR parameter (as defined in M5PREXX) on to YXXM5001. **Please note that the “XX” in the programs YXXM5001 and YXXSURDT are not an abbreviation for a series of years. The programs are actually named YXXM5001 and YXXSURDT. However, all “xx” in the dataset names do represent the series of years 1992-2001. This pattern is true for all of the processing that follows for AMI, Heart Failure and Stroke.**

5.1.1.1 Called Program:	D#MSQ.@MSQ00M5.PGMLIB99(YXXM5001) D#MSQ.@MSQ00M5.PGMLIB99(YXXSURDT)
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Purpose: Merge two M4 files to identify all base year discharges for beneficiaries with one or more admissions in the clinical priority areas.

Program Steps:

Step 1: Merge two M4 files, M4FLAGS and M4OTHER, to identify all base year discharges for beneficiaries with one or more admissions in the MQMS clinical priority areas.

Step 2: Only the beneficiaries with the 8 CC discharges enrolled in July 1 (M14 cohort) are selected from M4FLAGS.

Step 3: All other discharges from the M4OTHER file for people with these index discharges are selected.

Step 4: A surgical date variable is constructed (discharges with errors in the surgical date are written to a separate file for further analysis).

Step 5: A finder file is also created to be an input file for DSAF to get cross-referenced HICNOS.

6. PRODUCTION JCL: D#MSQ.@MSQ00M5.PGMLIBxx (M5PRODxx)

Purpose: This job executes the cataloged procedure M5PROD for a specified year (e.g., M5PROD92 for 1992). To run this job for other years, simply define the year of analysis in the YEAR parameter (2 digit year). The year parameter is passed on to M5PROD (the called catalogued procedure), which then passes it on to all the subsequent macro and SAS programs. All programs from this point forward are run based on the execution of this production JCL.

6.1 Catalogued Procedure: D#MSQ.@MSQ00M5.PGMLIB99 (M5PROD)

This is a cataloged procedure with four steps. The procedure executes SAS macro calls (named SYSM502 through SYSM505), which in turn execute corresponding macro programs (YXXM5002 through YXXM5005). The YEAR parameter defined in the production JCL M5PRODXX is passed onto this program, defining the year to which all subsequent programs will be executed.

6.1.1 Macro Program: D#MSQ.@MSQ00M5.PGMLIB99 (SYSM502)

Input data:	TI03.@MSQ0000.M5XREF.OUTPUT.NODUPE D#MSQ.@MSQ0000.SAS.YxxM5001.YxxM5IN1 D#MSQ.@MSQ0000.SAS.YxxM1001.DENOMAx
Output data:	D#MSQ.@MSQ0000.SAS.YxxM5002.YxxM5IN2 D#MSQ.@MSQ0000.SAS.YxxM5002.Yxx+1M5DUP D#MSQ.@MSQ0000.SAS.YxxM5002.YxxM5XR

Purpose: Macro call to program YXXM5002. This macro passes the YEAR parameter (as defined in M5PRODXX) on to YXXM5002. **Please note that the “xx+1” in the dataset name D#MSQ.@MSQ0000.SAS.YxxM5002.Yxx+1M5DUP is an abbreviation for the year “xx” plus one year. For example, for “xx”=1992, the dataset name is D#MSQ.@MSQ0000.SAS.Y92M5002.Y93M5DUP.**

6.1.1.1 Called Program: D#MSQ.@MSQ00M5.PGMLIB99 (YXXM5002 or YXXM502a)

Purpose: Create a person-level files with “end of enrollment” and “death” variables and merge with stratifying variables from the base-year denominator file.

Program Steps:

Step 1: Create a person-level file with “end of enrollment” and “death” variables and merge with stratifying variables from the base-year denominator file.

6.1.2 Macro Program: D#MSQ.@MSQ00M5.PGMLIB99 (SYSM503)

Input data: D#MSQ.@MSQ0000.SAS.YxxM5001.YxxM5IN1
D#MSQ.@MSQ0000.SAS.YxxM5002.YxxM5IN2
Output data: D#MSQ.@MSQ0000.SAS.YxxM5003.YxxM5IN3

Purpose: Macro call to program YXXM5003. This macro passes the YEAR parameter (as defined in M5PRODXX) on to YXXM5003.

6.1.2.1 Called Program:

D#MSQ.@MSQ00M5.PGMLIB99(YXXM5003 or YXXM503a)
D#MSQ.@MSQ00M5.PGMLIB99(YXXMEASR)

Purpose: Create index flags for all discharges in the base-year file corresponding to each measure and each window (i.e., time period) within each measure.

Program Steps:

Step 1: Create index flags for all discharges in the base-year file corresponding to each measure and each window (i.e., time period) within each measure.

6.1.3 Macro Program: D#MSQ.@MSQ00M5.PGMLIB99(SYSM504)

Input data: D#MSQ.@MSQ0000.SAS.YxxM5002.YxxM5IN2
D#MSQ.@MSQ0000.SAS.YxxM5003.YxxM5IN3
D#MSQ.@MSQ0000.SAS.YxxM5002.YxxM5DUP
D#MSQ.@MSQ0000.SAS.YxxM5002.YxxM5XR
D#MSQ.@MSQ0000.SAS.YxxM2007.MEDPRGxx
Output data: D#MSQ.@MSQ0000.SAS.YxxM5004.YxxM5IN4

Purpose: Macro call to program YXXM5004. This macro passes the YEAR parameter (as defined in M5PRODXX) on to YXXM5004.

6.1.3.1 Called Program: D#MSQ.@MSQ00M5.PGMLIB99(YXXM5004
or YXXM504a or YXXM504b)
D#MSQ.@MSQ00M5.PGMLIB99(YXXFLAGS)

Purpose: Create a discharge file by combining 1, 2, or 3 years of data for beneficiaries with the index CC discharge.

Program Steps:

Step 1: Create a discharge file by combining one, two, or three years of data for beneficiaries with the index CC discharge.

6.1.4 Macro Program: D#MSQ.@MSQ00M5.PGMLIB99(SYSM505)

Input data: D#MSQ.@MSQ0000.SAS.YxxM5001.YxxM5IN4

Output data: D#MSQ.@MSQ0000.SAS.YxxM5005.YxxM5ANA

Purpose: Macro call to program YXXM5005. This macro passes the YEAR parameter (as defined in M5PRODXX) on to YXXM5005.

6.1.4.1 Called Program: D#MSQ.@MSQ00M5.PGMLIB99(YXXM5005)
D#MSQ.@MSQ00M5.PGMLIB99(YXXMEASR)

Purpose: Create M5 Analysis File containing readmission flags.

Program Steps:

Step 1: Create M5 Analysis File containing readmission flags.

7. PRODUCTION JCL: D#MSQ.@MSQ00M6.PGMLIBxx (M6PRODxx)

Purpose: This job executes the cataloged procedure M6PROD for a specified year (e.g., M6PROD92 for 1992). To run this job for other years, simply define the year of analysis in the YEAR parameter (2 digit year). The year parameter is passed on to M6PROD (the called catalogued procedure), which then passes it on to all the subsequent macro and SAS programs. All programs from this point forward are run based on the execution of this production JCL.

7.1 Catalogued Procedure: D#MSQ.@MSQ00M6.PGMLIB99 (M6PROD)

This is a cataloged procedure with one step. The procedure executes a SAS macro call (named SYSM601), which in turn executes a corresponding macro program (YXXM5001). The YEAR parameter defined in the production JCL M6PRODXX is passed onto this program, defining the year to which all subsequent programs will be executed.

7.1.1 Macro Program: D#MSQ.@MSQ00M6.PGMLIB99 (SYSM601)

Input data:	D#MSQ.@MSQ0000.SAS.YxxM5005.YxxM5ANA
	D#MSQ.@MSQ0000.SAS.Y99M1004.AGESEX99
Output data:	D#MSQ.@MSQ0000.SAS.YxxM6001.YxxM6GRP
	D#MSQ.@MSQ0000.SAS.YxxM6001.YxxM6DEN

Purpose: Macro call to program YXXM6001. This macro passes the YEAR parameter (as defined in M6PRODXX) on to YXXM6001.

7.1.1.1 Called Program: D#MSQ.@MSQ00.PGMLIB99 (YXXM6001)

Purpose: Create cohorts and construct variables to be used in calculating mortality rates and outputs two files: one containing only index admissions and the other containing all discharges for the 8 CCs.

Program Steps:

Step 1: Create cohorts and construct variables to be used in calculating mortality rates and outputs two files: one containing only index admissions and the other containing all discharges for the 8 CCs.

8. PRODUCTION JCL: <<intentionally blank>>

8.1 Catalogued Procedure: P1H4.@MSQ00AG.PGMLIB(Y99AGP)

Input data:	D#MSQ.@MSQ0000.SAS.YxxM5005.YxxM5ANA
	D#MSQ.@MSQ0000.SAS.YxxM6001.YXXM6GRP
	D#MSQ.@MSQ0000.SAS.YxxM6001.YxxM6DEN
Output data:	P1H4.@MSQ0000.SAS.YxxAGP01
	P1H4.@MSQ0000.SAS.YxxAGP02

Purpose: A catalogued procedure that calls the SAS programs YxxAGP01 and YxxAGP02.

8.1.1 Called Program:

P1H4.@MSQ00AG.PGMLIB(YxxAGP01)
P1H4.@MSQ00AG.PGMLIB(YxxAGP02)

Purpose: Create aggregate M5/M6 files to contain readmission and mortality data.

Program Steps:

Step 1: Files are produced to contain aggregate data on CC index admissions and discharges, readmissions, deaths, and time to readmission or death by stratifiers including provider location variables (state and region).

9. PRODUCTION JCL: <<intentionally blank>>

9.1 Catalogued Procedure: P1H4.@MSQ00AG.PGMLIB(ADJM5)
P1H4.@MSQ00AG.PGMLIB(ADJM6)

Input data: P1H4.@MSQ0000.SAS.YxxAGP02
P1H4.@MSQ0000.SAS.Y99M1.ADJWTS99
Output data: P1H4.@MSQ0000.SAS.YxxM5.ADRATExx
P1H4.@MSQ0000.SAS.YxxM6.AMRATExx

Purpose: A catalogued procedure that calls the SAS programs ADRATEM5 and ADRATEM6.

9.1.1 Called Program: P1H4.@MSQ00AG.PGMLIB(ADRATEM5)
P1H4.@MSQ00AG.PGMLIB(ADRATEM6)

Purpose: Produce M5/M6 measures for each year.

Program Steps:

Step 1: Readmission and mortality rates are computed by dividing the sum of numerator counts by the sum of denominator counts for each subgroup.

Step 2: Age/sex adjustment is performed as described in #4 above.

Step 3: Those rates that are based on 25 or less numerator counts are flagged to be replaced by a missing value (.).

10. PRODUCTION JCL: <<intentionally blank>>**10.1 Catalogued Procedure:** <<intentionally blank>>

Input data:	P1H4.@MSQ0000.SAS.YxxM5.ADRATExx
	P1H4.@MSQ0000.SAS.YxxM6.AMRATExx
Output data:	P1H4.@MSQ0000.SAS.Y9201M5.READMP
	P1H4.@MSQ0000.SAS.Y9201M6.MORTALP

Purpose: A catalogued procedure that calls the SAS programs MERGM5 and MERGEM6.

10.1.1 Called Program: P1H4.@MSQ00AG.PGMLIB(MERGEM5)
 P1H4.@MSQ00AG.PGMLIB(MERGEM6)

Purpose: Merge yearly M5/M6 data into one file

Program Steps:

Step 1: All the rates that are computed for a given year are merged across the years, i.e., 1992 to 2001.

11. PRODUCTION JCL: <<intentionally blank>>**11.1 Catalogued Procedure:** <<intentionally blank>>

Input data: P1H4.@MSQ0000.SAS.Y9201M4.cCTAB01
 P1H4.@MSQ0000.SAS.Y9201M4.cCTAB02
 P1H4.@MSQ0000.SAS.Y9201M4.cCTAB03
 P1H4.@MSQ0000.SAS.Y9201M4.cCTAB04
 P1H4.@MSQ0000.SAS.Y9201M5.READMP
 P1H4.@MSQ0000.SAS.Y9201M6.MORTALP
Output data: P1H4.@MSQ00M4.cCTABLE

Purpose: A catalogued procedure that calls the SAS programs TABLEUNA, TABLEADJ, TABLEM5, and TABLEM6.

11.1.1 Called Program: P1H4.@MSQ00AG.PGMLIB(TABLEUNA)
 P1H4.@MSQ00AG.PGMLIB(TABLEADJ)
 P1H4.@MSQ00AG.PGMLIB(TABLEM5)
 P1H4.@MSQ00AG.PGMLIB(TABLEM6)

Purpose: Convert the merged data into a downloadable Excel table format

Program Steps:

Step 1: SAS files containing the 1992-2001 table data are converted to ASCII table output files in a specified format, ready to be downloaded into Excel spreadsheet. Each table has the years going across the column and the stratifying variables going down the column in the following order:

- Age groups
- Gender
- Race
- Medicaid Buy-in
- Reason for Medicare Eligibility
- Urban/Rural Status
- Census Region (either beneficiary region or provider region)
- State (either beneficiary state or provider state)

CHAPTER IV
PATIENT SAFETY INDICATORS

PART I: METHODS

1. DESCRIPTION OF THE MEASURE

Commissioned by the Agency for Healthcare Research and Quality (AHRQ), the Evidence-based Practice Center (EPC) at the University of California San Francisco and Stanford University (UCSF-Stanford), with collaboration from the University of California Davis, have developed patient safety indicators (PSIs) that can measure “potential problems that patients experience resulting from exposure to the health care system, and that are likely amenable to prevention by changes at the level of the system” from routinely collected hospital claims data⁴. Following the previous refinement of quality indicators, a four pronged evaluation framework for validity testing was applied to each candidate PSI: a) background literature review, b) empirical analyses using hospital claims, c) opinions of the expert coders from the American Health Information Management Association (AHIMA), and d) clinical panel reviews based on a process adapted from the RAND organization and University of California Los Angeles (RAND/UCLA) Appropriateness Method. The process resulted in 20 provider-based PSIs that may be useful screens to identify problems at the hospital level, as well as to document systematic area level differences in potentially preventable adverse events or patient safety problems.

The purpose of using PSI measures from Medicare Part-A claims data is to help MQMS in its goal of monitoring quality improvement. The analysis will enable CMS to assess whether the incidence of adverse events appears to have increased or decreased nationally over time, whether any progress or problem is across all the measures examined or is more limited, and how progress appears to vary across states, regions, and demographic characteristics of the enrollees. These measures are based on a combination of International Classification of Disease, Clinical Modification (ICD-9-CM) discharge diagnosis and procedure codes; dates of admission, discharge and major procedures; age; gender; and diagnostic related group (DRG). The PSI measures document the count and rate per relevant discharges, the evidence of safety violations or adverse events that could be prevented with appropriate interventions. The summary tables present aggregate counts, unadjusted rates, and age/sex adjusted rates for 16 of the 20 provider-based PSI measures in total, and stratified by demographic subgroups, including age group, sex, race, Medicare eligibility status, Medicaid enrollment status, and geographic area. The remaining 4 PSIs that measure obstetric complications are less relevant for Medicare beneficiaries. A list of the specific PSI measures used in the MQMS is given in Appendix C.

1. CMS DATA SOURCES

Four sources of data are used to construct the unadjusted rates, and the age/sex adjusted rates for each of the PSIs.

⁴ See McDonald et. al. for a detailed description of the PSI measures and the methods adopted for validation and acceptance.

- 1) The 1992-2001 MQMS MedPAR claims files prepared by RTI. These intermediate files are produced in the process of making M2/M3 tables.
- 2) The 1992-2001 Cross-Reference files for beneficiaries with a MedPAR claims in the respective year. These files have the listings of all Medicare beneficiary identification numbers (historical IDs) under which the beneficiary has been entitled to receive Medicare benefits. These files allow one to link across multiple identification numbers and establish a unique number for each Medicare beneficiary.
- 3) The 1992-2001 MQMS Base Analytic Denominator File with the identification of Medicare beneficiaries who are included in the MQMS. It also provides beneficiary-level demographic and eligibility and enrollment information for analysis by subgroups of interest.
- 4) The 1992-2001 MQMS M1-3 Age and Age/Sex Count file provides the number of Medicare FFS Part A Enrollees on July 1 included in the MQMS, in total, and by subgroups of interest. These counts are used to age/sex adjust MQMS outcomes measures.

2. INCLUSION CRITERIA

The MedPAR discharge records are included in each of the PSI cohorts if they meet all of the following criteria:

- Discharge is a short-stay acute care hospital claim
- Discharge record is not a duplicate entry in the MedPAR file
- Discharge record in the MedPAR file meets the requirements for the PSI denominator count as coded in AHRQ's PSI software
- Beneficiary belongs to the MQMS M13/M14 Base Analytic Denominator File.

3. EXCLUSION CRITERIA

Claimants are excluded from the PSI cohorts if they meet any of the following exclusion criteria:

- Claimants residing outside of the United States, except claimants residing in Puerto Rico, Guam, and the Virgin Islands.
- Claimants with invalid values for date of birth, state code, sex, race, and Medicare status code.

4. DEFINITION OF KEY VARIABLES

Given below are definitions of key variables, in alphabetical order, that are used to report stratified PSI rates.

- Age Group: The following nine age groupings are used in formatting age and in conducting age/sex adjustments to rates:
 - 1 = 0-54
 - 2 = 55-64
 - 3 = 65-69
 - 4 = 70-74
 - 5 = 75-79
 - 6 = 80-84
 - 7 = 85-89
 - 8 = 90-94
 - 9 = 95+
- Census Region: Beneficiary Census Region of residence as of March 31st of the year following the reference year. Note that the Denominator File is created in April for the previous calendar year. The March update of the EDB is used to populate the fields for the previous year's Denominator File.
 - 0 = Puerto Rico and Virgin Islands
 - 1 = Northeast
 - 2 = Midwest
 - 3 = South
 - 4 = West
- Dual Flag: A dichotomous variable that identifies beneficiaries that are dually enrolled in Medicare and Medicaid at least one month during the calendar year, defined as the member being enrolled in Medicare Part A and with Medicaid buy-in at least one month during the calendar year.
 - 1 = Medicare and Medicaid dual enrollment
 - 0 = Not enrolled in Medicaid
- Medicare Status: Original reason for Medicare eligibility
 - 1 = Aged without ESRD
 - 2 = Aged with ESRD
 - 3 = Disabled without ESRD
 - 4 = Disabled with ESRD
 - 5 = ESRD only
- Race: Race of Beneficiary
 - 1 = White
 - 2 = African American
 - 3 = Other (Asian, Hispanic, North American Native, Other)
 - 0 = Unknown

- Sex: Gender of Beneficiary
 - 1 = Male
 - 2 = FemaleIf sex is unknown, PSI software excludes the discharge from the output file.
- State: Beneficiary state of residence as of March 31st of the year following the reference year. Note that the Denominator File is created in April for the previous calendar year. The March update of the EDB is used to populate the fields for the previous year's Denominator File. Residents of Guam will be reported with residents of Hawaii.
- Urban/Rural: A dichotomous variable defining beneficiary county of residence as an urban or rural location. All counties residing within a Metropolitan Statistical Area (MSA) are designated as urban areas.
 - 1 = Urban Area
 - 0 = Rural Area

5. COMPUTATIONS

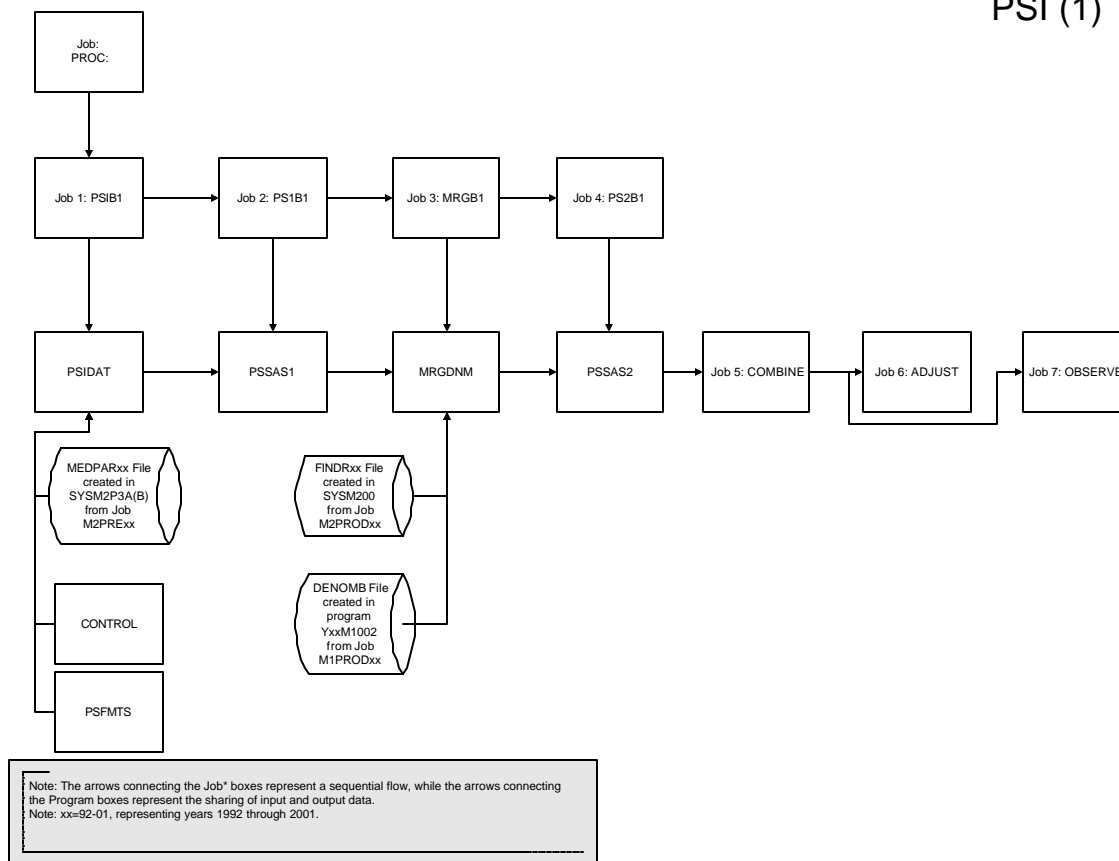
The principal output of PSI specifications is a set of tables that contain aggregate counts, unadjusted rates, and age/sex adjusted rates for each PSI measures in total and stratified by demographic subgroups, including age group, sex, race, Medicare eligibility status, Medicaid enrollment status, and geographic area.

- 1) Unadjusted rates of claimants per 1,000 Medicare enrollees:
 - a. Numerator: Number of eligible discharges with the evidence of violations or adverse events, in total, and by demographic subgroups.
 - b. Denominator: Number of eligible discharges, in total, and stratified by demographic subgroups.
- 2) Age/Sex adjusted rates through direct standardization using the Medicare Part A FFS population as of July 1, 1999 as the standard population.
 - a. Calculate proportion of standard population within 18 age/sex standardization cells (two sex and nine age categories).
 - b. Calculate unadjusted PSI rates, in total, and by stratifying variables within the 18 age/sex standardization cells.
 - c. Calculate age/sex adjusted PSI rates, in total, and by stratifying variables by multiplying the unadjusted rates by proportion of standard population within the 18 age/sex adjustment cells and summing across the 18 age/sex adjustment cells. There are three exceptions to this rule: 1) a modified 8 age/sex adjustment cells are used for the state-specific PSIs, 2) age-specific

PSIs are adjusted with 2 cell population ratios of sex-groups, and 3) the sex-specific adjustments are made with a 9 cell population ratios of age-groups.

PART II: FLOWCHARTS

PSI (1)



PART III: DATA PROCESSING

1. PRODUCTION JCL: <<intentionally blank>>

1.1 Catalogued Procedure: D#MSQ.@MSQ01.PGMLIB(PSIB1)

Input Files: D#MSQ.@MSQ0000.SAS.M2PRE3.MEDPARxx
Output Files: TRA0.@MSQ0000.SAS.PSIDAT.MEDPARxx

Purpose: A catalogued procedure that executes the SAS program PSIDAT.

1.1.1 Called Program: D#MSQ.@MSQ01.PGMLIB(PSIDAT)

Purpose: Create the input files for the PSI software using hospital discharge records. AHRQ's PSI software was written to process hospital discharge data in HCUP format. Since the MEDPAR formats are somewhat different, recode the variables in the RTI files to meet the variable coding schemes suggested by the PSI software.

Program Steps:

Step 1: Start with the SAS databases that RTI has constructed using MedPAR data for the purposes of generating the M2/M3 tables.

Step 2: Apply the specifications in Appendix D to create the input file.

2. PRODUCTION JCL: <<intentionally blank>>

2.1 Catalogued Procedure: D#MSQ.@MSQ01.PGMLIB(PS1B1)

Input Files: TRA0.@MSQ0000.SAS.PSIDAT.MEDPARxx
Output Files: TRA0.@MSQ0000.SAS.PSSAS1.MEDPARxx

Purpose: Procedure with multiple steps with each step executing PSSAS1 for each year of MedPAR data

2.1.1 Called Programs: D#MSQ.@MSQ01.PGMLIB(PSSAS1)
 D#MSQ.@MSQ01.PGMLIB(CONTROL)
 D#MSQ.@MSQ01.PGMLIB(PSFMTS)

Purpose: Add PSI indicators to the discharge records.

Program Steps:

Step 1: Run the SAS program PSSAS1 developed by AHRQ on the input files constructed in 1.1.1 to add patient safety indicators (PSIs) to the individual discharge records for each year of data.

Step 2: The PSSAS1 program makes use of another SAS program PSFMTS developed by AHRQ to define the numerators and the denominators for each of the PSIs. This program uses 20 binary PSI variables TPPS01-TPPS20 to flag the discharge level records with the PSIs of interest. These variables are initialized with value of zero and subsequently assigned a value of one, if the discharge record qualifies to be in the numerator count of a particular PSI. If the discharge record is not applicable for the denominator count, the PSI variable is set to missing.

3. PRODUCTION JCL: <<intentionally blank>>

3.1 Catalogued Procedure: D#MSQ.@MSQ01.PGMLIB(MRGB1)

Input Files:	TRA0.@MSQ0000.SAS.PSSAS1.MEDPARxx
	D#MSQ.@MSQ0000.SAS.YxxM1002.DENOMBxx
	D#MSQ.@MSQ0000.SAS.M2XREF.FINDRxx
Output Files:	TRA0.@MSQ0000.SAS.MRGDNM.MEDPARxx

Purpose: A catalogued procedure that calls the SAS program MRGDNM.

2.1.1 Called Program: D#MSQ.@MSQ01.PGMLIB(MRGDNM)

Purpose: Merge discharge records with PSI indicators to the Base Analytic Denominator Files. Run this step to add the analysis variables from the denominator file, and to restrict the discharge records to the MQMS population.

Program Steps:

Step 1: Since beneficiary ID number could change over time, the merge process makes use of the cross-reference file that contains a master Medicare ID (HICNO), and a cross-reference ID (XREF). If a person uses more than one Medicare ID, the x-ref file will have multiple records for that person with the same HICNO but different XREF – one for each Medicare ID. In the process of creating the M2/M3 tables, RTI has created the cross-reference files for the individuals with discharge records in 1.1.1.

Step 2: The merge process starts by merging the Base Analytic Denominator file with the cross-reference file (by XREF). This step keeps the Denominator records with relevant variables that find a match with the cross-reference file. At this point, some Denominator records have duplicate entries for the individuals who used different ID numbers over time. This file is then de-duplicated (by HICNO) and merged back to the original cross-reference file (by HICNO). This step ensures that all the XREFs in the cross-reference file have denominator records for all the HICNOs that have matching denominator records. The Denominator-Enhanced Cross Reference file is then merged with the output file from the PSSAS1 program in 2.1.1.

4. PRODUCTION JCL: <<intentionally blank>>**4.1 Catalogued Procedure: D#MSQ.@MSQ01.PGMLIB(PS2B1)**

Input Files: TRA0.@MSQ0000.SAS.MRGDNM.MEDPARxx
Output Files: TRA0.@MSQ0000.SAS.PSSAS2.MEDPARxx

Purpose: Procedure with multiple steps with each step executing PSSAS2 for each year of data.

4.1.1 Called Program: D#MSQ.@MSQ01.PGMLIB(MRGDNM)

Purpose: Create yearly summary PSI databases.

Program Steps:

Step 1: Use a modified version of the AHRQ's PSSASP2 program (PSSAS2) to summarize the PSIs into various strata for each year of discharge data. The summary statistics include the sum of the numerators, sum of the denominators, and the observed rates for each of the PSIs. The summarization is done based on all possible stratification using the following eight analysis variables:

- 1) Age groups
- 2) Gender
- 3) Race
- 4) Medicaid Buy-in
- 5) Reason for Medicare Eligibility
- 6) Urban/Rural Status
- 7) Census Region
- 8) State

Appendix E shows all 256 possible stratification with the variable `_TYPE_`. The variables `TPPS01-TPPS16` sum the numerators, `PPPS01-PPPS16` sum the denominators, and `OPPS01-OPPS16` compute the observed rates for the 16 PSIs of interest. According to Appendix E, the observed rates for overall US is obtained by selecting summary records of `_TYPE_ = 0`. Similarly, age-specific summary statistics are obtained by selecting records with `_TYPE_ = 128`, and sex-specific summary data is obtained by selecting observations with `_TYPE_ = 64`. Likewise, to get the observation with the interactions of all eight stratifying variables, we select records with `_TYPE_ = 255`.

5. PRODUCTION JCL: <<intentionally blank>>

5.1 Catalogued Procedure: <<intentionally blank>>

Input Files: TRA0 .@MSQ0000 .SAS .PSSAS2 .MEDPARxx
Output File: TRA0 .@MSQ0000 .SAS .COMBINE .SUM9201

Purpose: A catalogued procedure that calls the SAS program COMBINE.

5.1.1 Called Program: D#MSQ .@MSQ01 .PGMLIB (COMBINE)

Purpose: Create a combined database of the yearly summary statistics. Essentially, this is a step to merge all the yearly summary files to one combined file.

Program Steps:

Step 1: Merge the yearly summary files. The summary variables will be renamed in the merge process by adding a 2 digit suffix for the year of data. For example, TPPS01, PPPS01 and OPPS01 for 1992 will be renamed to TPPS0192, PPPS0192, and OPPS0192, respectively. The process will use the same “by” variables to merge the yearly summary files as the “class” variables used to generate the summary statistics. As a result, the combined file will maintain the referential integrity of various stratifications across the years.

6. PRODUCTION JCL: <<intentionally blank>>**6.1 Catalogued Procedure:** <<intentionally blank>>

Input File: TRA0 . @MSQ0000 . SAS . COMBINE . SUM9201
Output File: PROC PRINT

Purpose: A catalogued procedure that calls the SAS program OBSERVE.

6.1.1 Called Program: D#MSQ . @MSQ01 . PGMLIB (OBSERVE)

Purpose: Produce observed rates for 16 PSIs by various strata.

Program Steps:

Step 1: The program selects observations with the following values of the `_TYPE_` variable:

<code>_TYPE_</code>	Strata
0	None (overall US)
1	Medicaid Buy-in
2	Medicare Eligibility
4	Race
8	Urban/Rural
16	State
32	Census Region
64	Sex
128	Age groups

Step 2: A PROC PRINT produces the tables of observed rates by the strata as mentioned above.

7. PRODUCTION JCL: <<intentionally blank>>

7.1 Catalogued Procedure: <<intentionally blank>>

Input File: TRA0 .@MSQ0000 .SAS .COMBINE .SUM9201
Output File: PROC PRINT

Purpose: A catalogued procedure that calls the SAS program ADJUST.

7.1.1 Called Program: D#MSQ .@MSQ01 .PGMLIB (ADJUST)

Purpose: Produce adjusted rates for 16 PSIs by various strata

Program Steps:

Step 1: Apply the method of direct standardization to adjust the observed rates. Except for state-specific PSI rates, the program uses 18 age-sex cells using FFS population of July 1999. The program also uses 2-cell, and 9-cell population ratios files for sex-adjusting the age-groups, and age-adjusting the sex-groups, respectively. The program selects the subsets of data from the Combined Summary File using the following values of the `_TYPE_` variable:

<code>_TYPE_</code>	Strata
192	Age-sex-adjusted rates for overall US
192	Sex-adjusted rates by age groups
192	Age-adjusted rates by gender
196	Age-sex-adjusted rates by race
200	Age-sex-adjusted rates by urban/rural
208	Age-sex-adjusted rates by states
224	Age-sex-adjusted rates by census region
194	Age-sex-adjusted rates by Medicare eligibility
193	Age-sex-adjusted rates by Medicaid buy-in status

Step 2: To do the adjustments, the program sorts these subsets by primary strata (e.g. race), and age and sex. The adjusted rates are then obtained by summing weighted rates by the primary strata (e.g. race). When there is no primary strata (e.g. Overall US), the subsets are sorted by age and sex and the adjustments are done by summing the weighted rates. The

program makes an age-adjustment the observed rates for sex groups and sex-adjustment for the age groups.

Step 3: State-specific adjustment uses 8 age-sex cells, instead of 18 age-sex cells. The observed rates are re-computed for the revised age-sex groups using the numerator and denominator counts in the combined summary database. After computing the revised observed rates for the state-specific strata, the same method of age-sex adjustments are done as in 18 age-sex cells above. A hypothetical example with 8 age-sex cells follows:

Age Category	Sex Category	Observed Rate (OPPS0x)	Proportion of FFS Beneficiaries in 1999	Adjusted Rate
<65	Male	.000000	0.08747	0
<65	Female	.009259	0.0666	0.000617
65-74	Male	.004115	0.19764	0.000813
65-74	Female	.045455	0.23849	0.010841
75-84	Male	.007026	0.11677	0.00082
75-84	Female	.066667	0.18292	0.012195
>=85	Male	.041667	0.03049	0.00127
>=85	Female	.029412	0.07962	0.002342
Total		0.203601	1.00	0.028898

Step 4: After the adjustments, a PROC PRINT in the program produces the sum of the weighted rates for each PSI.

CHAPTER V

METHODS, FLOWCHARTS, AND

SPECIFICATIONS FOR

PREVENTION QUALITY INDICATORS (PQI)

PART I: METHODS

1. DESCRIPTION OF THE MEASURE

The purpose of this task is to produce MQMS prevention quality indicators (PQIs) from Medicare Part A hospital claims data, in order to assess trends in access to and quality of Medicare ambulatory care services. We will develop PQIs as defined in AHRQ's Health Care and Utilization Project (HCUP), using software from AHRQ's PQI software (AHRQ 2001)⁵. These indicators, which are often generically referred to as ambulatory-care sensitive conditions, avoidable hospitalizations, or preventable hospitalizations, will be measured as rates—typically the number of hospitalizations for specific ambulatory-sensitive conditions per 10,000 Medicare beneficiaries living in defined geographic areas. In general, higher rates of admissions for these conditions are potential indicators of reduced quality of or access to ambulatory services for Medicare beneficiaries. Unlike AHRQ's patient safety indicators, PQIs are not indicators of potential inpatient hospital care quality problems. Of AHRQ's 16 PQIs, we will use the following 13 indicators for MQMS.⁶ These indicators will be tracked from 1992 to 2001.

1. Bacterial pneumonia
2. Dehydration
3. Urinary tract infection
4. Angina without procedure
5. Perforated appendix⁷
6. Congestive heart failure
7. Hypertension
8. Adult asthma
9. Chronic obstructive pulmonary disease
10. Diabetes short-term complication
11. Diabetes long-term complication
12. Uncontrolled diabetes

⁵See <http://www.qualityindicators.ahrq.gov/data/hcup/prevqi.htm#download> for SAS programs and documentation materials, including AHRQ (2001).

⁶ Three PQIs—pediatric gastroenteritis, low birthweight, and pediatric diabetes—are less relevant for the Medicare population.

⁷ Unlike the other measures chosen for inclusion, AHRQ defines this PQI as the rate of perforated appendix admissions per all admissions for appendicitis, versus the total population living in the area.

13. Lower extremity amputation among patients with diabetes

Past research has shown higher rates of hospitalizations for ambulatory-care sensitive conditions among certain vulnerable population groups and those living in communities with reduced access to care. [See, for example, Pappas et al. (1997); Blustein, Hanson and Shea (1998); Culler, Parchman, and Przybylski (1998); and Gaskin and Hoffman (2000)].

In a recent study, Kozak, Hall and Owings (2001) showed a substantial increase in nationwide rates of hospitalization for selected ambulatory-care sensitive conditions among the elderly (age 65 or older) from 1980 to 1998—with little or no trend evident for younger people. The trend for the elderly was driven to a large extent by a near-doubling in the rate of hospitalizations for the two most prevalent conditions studied—pneumonia and congestive heart failure (CHF)—over this period. Annual hospitalization rates for pneumonia increased from 115 to 222 per 10,000 population and hospitalization rates for CHF increased from 145 to 247 per 10,000. The authors offer several possible explanations for these findings, including increased out-of-pocket costs for prescription drugs for Medicare beneficiaries, the relatively low penetration of HMOs in the Medicare market compared to the private sector, the overall aging of the Medicare population, increased severity and prevalence of the disease conditions, and possible lower thresholds used by physicians for hospitalization for the elderly for these conditions. Analysis of the MQMS data should enable further investigation of these findings, for the period 1992 to 2001. In particular, a subset of measures, including pneumonia and congestive heart failure, are in both AHRQ's PQIs and the work by Kozak, Hall, and Owings, although the precise definitions at the ICD-9 level may differ.

2. CMS DATA SOURCES

Four sources of data are used to construct the unadjusted rates, and the age/sex adjusted rates for each of the PQIs.

- 5) The 1992-2001 MQMS MedPAR claims files prepared by RTI. These intermediate files are produced in the process of making M2/M3 tables.
- 6) The 1992-2001 Cross-Reference files for beneficiaries with a MedPAR claims in the respective year. These files have the listings of all Medicare beneficiary identification numbers (historical IDs) under which the beneficiary has been entitled to receive Medicare benefits. These files allow one to link across multiple identification numbers and establishes a unique number for each Medicare beneficiary.
- 7) The 1992-2001 MQMS Base Analytic Denominator File with the identification of Medicare beneficiaries who are included in the MQMS. It also provides beneficiary-level demographic and eligibility and enrollment information for analysis by subgroups of interest.

-
- 8) The 1992-2001 MQMS M1-3 Age and Age/Sex Count file provides the number of Medicare FFS Part A Enrollees on July 1 included in the MQMS, in total, and by subgroups of interest. These counts are used to age/sex adjust MQMS outcomes measures.

3. INCLUSION CRITERIA

The MedPAR discharge records are included in each of the PQI cohorts if they meet all of the following criteria:

- Discharge is a short-stay acute care hospital claim
- Discharge record is not a duplicate entry in the MedPAR file
- Discharge record in the MedPAR file meets the requirements for the PQI denominator count as coded in AHRQ's PQI software
- Beneficiary belongs to the MQMS M13/M14 Base Analytic Denominator File.

4. EXCLUSION CRITERIA

Claimants are excluded from the PQI cohorts if they meet any of the following exclusion criteria:

- Claimants residing outside of the United States, except claimants residing in Puerto Rico, Guam, and the Virgin Islands.
- Claimants with invalid values for date of birth, state code, sex, race, and Medicare status code.

5. DEFINITION OF KEY VARIABLES

Given below are definitions of key variables, in alphabetical order, that are used to report stratified PQI rates.

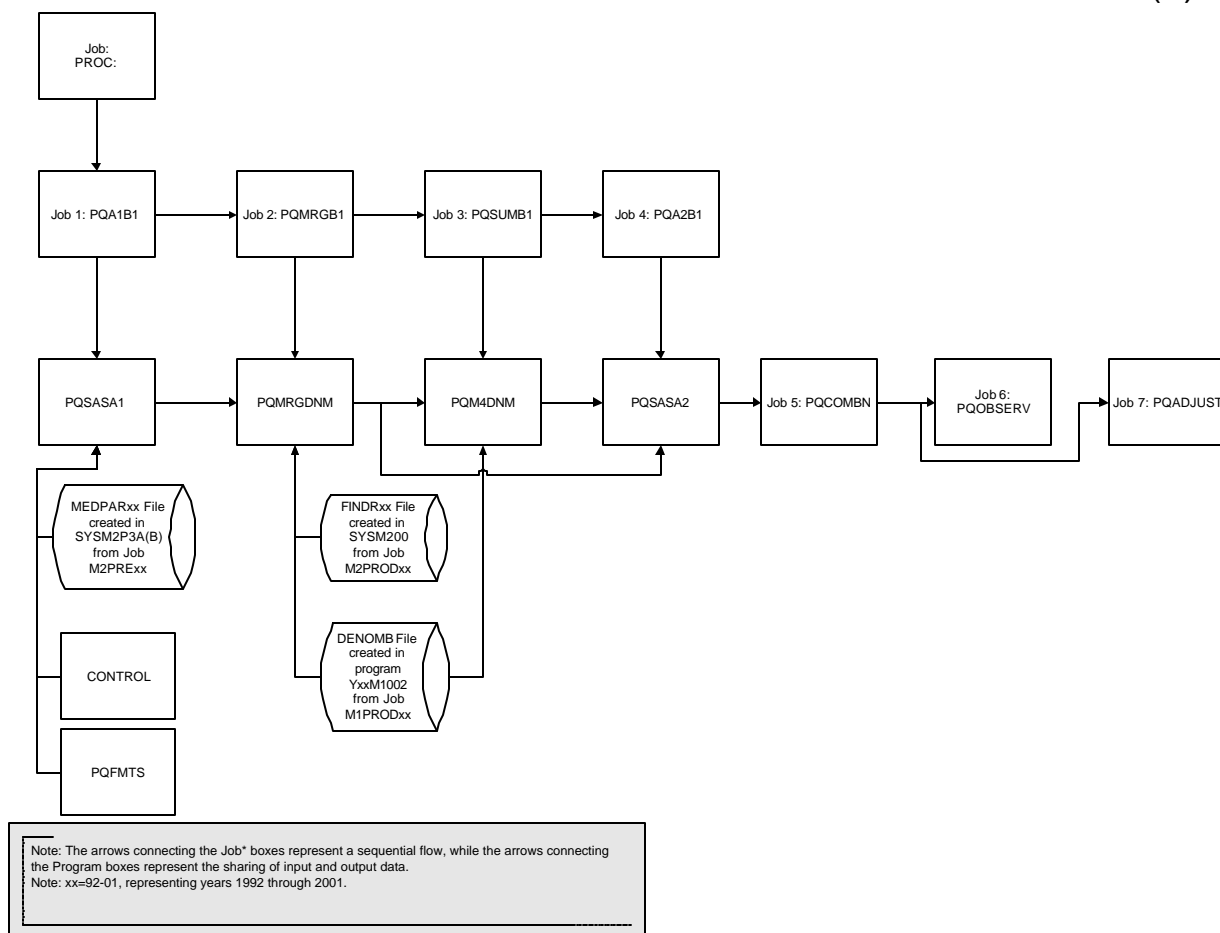
- Age Group: The following nine age groupings are used in formatting age and in conducting age/sex adjustments to rates:
 - 1 = 0-54
 - 2 = 55-64
 - 3 = 65-69
 - 4 = 70-74
 - 5 = 75-79
 - 6 = 80-84
 - 7 = 85-89
 - 8 = 90-94
 - 9 = 95+

- **Census Region: Beneficiary** Census Region of residence as of March 31st of the year following the reference year. Note that the Denominator File is created in April for the previous calendar year. The March update of the EDB is used to populate the fields for the previous year's Denominator File.
 - 0 = Puerto Rico and Virgin Islands
 - 1 = Northeast
 - 2 = Midwest
 - 3 = South
 - 4 = West
- **Dual Flag:** A dichotomous variable that identifies beneficiaries that are dually enrolled in Medicare and Medicaid at least one month during the calendar year, defined as the member being enrolled in Medicare Part A and with Medicaid buy-in at least one month during the calendar year.
 - 1 = Medicare and Medicaid dual enrollment
 - 0 = Not enrolled in Medicaid
- **Medicare Status:** Original reason for Medicare eligibility
 - 1 = Aged without ESRD
 - 2 = Aged with ESRD
 - 3 = Disabled without ESRD
 - 4 = Disabled with ESRD
 - 5 = ESRD only
- **Race:** Race of Beneficiary
 - 1 = White
 - 2 = African American
 - 3 = Other (Asian, Hispanic, North American Native, Other)
 - 0 = Unknown
- **Sex:** Gender of Beneficiary
 - 1 = Male
 - 2 = FemaleIf sex is unknown, PQI software excludes the discharge from the output file.
- **State:** Beneficiary state of residence as of March 31st of the year following the reference year. Note that the Denominator File is created in April for the previous calendar year. The March update of the EDB is used to populate the fields for the previous year's Denominator File. Residents of Guam will be reported with residents of Hawaii.

- Urban/Rural: A dichotomous variable defining beneficiary county of residence as an urban or rural location. All counties residing within a Metropolitan Statistical Area (MSA) are designated as urban areas.
 - 1 = Urban Area
 - 0 = Rural Area

PART II: FLOWCHARTS

PQI (1)



PART III: DATA PROCESSING

1. PRODUCTION JCL: <<intentionally blank>>

1.1 Catalogued Procedure: TRA0 .@MSQ0000 .PQI (PQA1B1)

Input Files:	TRA0 .@MSQ0000 .SAS .PSIDAT .MEDPARxx
	TRA0 .@MSQ0000 .PQI (CONTROL)
	TRA0 .@MSQ0000 .PQI (PQFMTS)
Output Files:	TRA0 .@MSQ0000 .SAS .PQSASA1 .MEDPARxx

Purpose: A catalogued procedure that calls the SAS program PQSASA1.

1.1.1 Called Program: TRA0 .@MSQ0000 .PQI (PQSASA1)

Purpose: Add PQI indicators to the discharge records.

Program Steps:

Step 1: We start with the SAS data files that have been constructed from MedPAR data to generate the M2 and M3 tables. These files contain all eligible hospital discharges for Medicare beneficiaries eligible for inclusion in MQMS. The names of the data files follow the naming convention: D#MSQ .@MSQ0000 .SAS .M2PRE3 .MEDPARxx. The last two digits of the file names reflect the year of the MedPAR data. The internal SAS dataset names are the same as the last node of the file names. For year 2000, for example, the SAS dataset name is MEDPAR00.

AHRQ's PQI software is written to process hospital administrative discharge data. Since the formats of hospital discharge data and Medicare claims are somewhat different, we construct or recode variables in the MedPAR data files to meet the variable coding conventions required by the PQI software. The specifications for these newly constructed and recoded variables are described in Appendix F.

Step 2: Run AHRQ's PQI SAS program PQSASA1 on the input files constructed in step (1) to add PQIs to the individual discharge records for each year of data. This program uses 16 binary PQI variables TAPQ1–TAPQ16 to flag the discharge level records with the PQIs of interest. Note: we calculate PQI indicators for all 16 AHRQ PQIs for completeness, but we only include the 13 listed above in our analysis and report, for the reasons already given. These variables are initialized with value of zero and subsequently assigned a value of one, if the discharge record qualifies to be in the numerator count of a particular PQI. If the discharge record is not applicable for the denominator count of a particular PQI (specifically for appendicitis), the PQI variable is set to missing. The name of this output file with PQI indicator variables is PQA1.

2. PRODUCTION JCL: <<intentionally blank>>

2.1 Catalogued Procedure: TRA0 .@MSQ0000 .PQI (PQMRGB1)

Input Files:	D#MSQ .@MSQ0000 .SAS .M2XREF .FINDxx TRA0 .@MSQ0000 .SAS .PQSASA1 .MEDPARxx D#MSQ .@MSQ0000 .SAS .YxxM1002 .DENOMBxx
Output Files:	TRA0 .@MSQ0000 .SAS .PQMRGDNM .MEDPARxx

Purpose: A catalogued procedure that calls the SAS program PQMRGDNM.

2.1.1 Called Program: TRA0 .@MSQ0000 .PQI (PQMRGDNM)

Purpose: Merge discharge records with PQI indicators to the Base Analytic Denominator File in order to restrict the discharge records to the MQMS population, and to add analysis variables from the Denominator File to the discharge records.

Program Steps:

Step 1: We run this step to add some analysis variables to the PQA1 output file from the Medicare Denominator file, and to restrict the discharge records to the MQMS population. We use the following Denominator files to merge the discharge records of the respective years: D#MSQ .@MSQ0000 .SAS .YxxM1002 .DENOMBxx. The second and third digit of the fourth node, and the last two digits of the last node, reflect the year of the Denominator File. The internal SAS dataset names are the same as the last node of the Denominator file names. For year 2000, for example, the SAS dataset name is DENOMB00.

Step 2: Since beneficiary ID number could change over time, the merge process makes use of the cross-reference file that contains a master Medicare ID (HICNO), and a cross-reference ID (XREF). If a person uses more than one Medicare ID, the cross-reference file will have multiple records for that person with the same HICNO but different XREF – one for each Medicare ID. We use the following cross-reference files (that have already been created in M2 processing): D#MSQ .@MSQ0000 .SAS .M2XREF .FINDRxx. The last two digits of the file name reflect the year of the MedPAR file for which the cross-reference file is created. The internal SAS dataset names are the same as the last nodes. So for 2000, the SAS dataset name is FINDR00.

Step 3: The merge process starts by merging the Base Analytic Denominator File with the cross-reference file (by XREF). This step keeps the Denominator records with relevant variables that match with the cross-reference file. At this point, some Denominator records have duplicate entries for the individuals who used different ID numbers over time. This file is then sorted by HICNO with a NODUPKEY option to remove duplicate records. The next step merges the denominator records with unique HICNO to the original cross-reference file (by HICNO). This step adds the denominator records for all records for a unique HICNO that have matching denominator records. This file is then merged with the output files created in step (2).

3. PRODUCTION JCL: <<intentionally blank >>

3.1 Catalogued Procedure: TRA0 .@MSQ0000 .PQI (PQSUMB1)

Input Files: D#MSQ .@MSQ0000 .SAS .YxxM1002 .DENOMBxx
 Output Files: TRA0 .@MSQ0000 .SAS .PQM4DNM .MEDPARxx

Purpose: A catalogued procedure that calls the SAS program PQM4DNM.

3.1.1 Called Program: TRA0 .@MSQ0000 .PQI (PQM4DNM)

Purpose: Create summary variables of population counts used as denominators for the PQI measures.

Program Steps:

Step 1: We use a modified version of the AHRQ's PQSASA2 program to summarize the PQIs (create rates) into various strata for each year of discharge data. The input files for this data processing step are the PQA1 file modified in step 3 (source of the PQI numerator) and a text file containing counts of the number of Medicare FFS beneficiaries according to stratification characteristics (source of PQI denominators, with exception of perforated appendix and low birth-weight). This text file is a modified version of the QICTYYY.TXT file available from AHRQ, replacing existing Census population counts with Medicare FFS beneficiary counts to be derived from the Medicare Denominator file. The summary statistics include the sum of the numerators, sum of the denominators, and the observed rates for each of the PQIs. The summarization is performed based on all possible stratification using the following analysis variables:

- Age groups
- Gender
- Race
- Medicaid Buy-in
- Reason for Medicare Eligibility
- Urban/Rural Status
- Census Region
- State

Appendix G shows all possible stratification with the variable `_TYPE_` showing all 256 types of interactions with the summary statistics. The variables `TAPQ01-TAPQS06` sums the numerators, `PAPQS01-PAPQ16` sums the denominators, and `OAPQ01-OAPQ16` computes the observed rates for the 16 PQIs.

According to Appendix G, the observed rates for overall US is obtained by selecting summary records of `_TYPE_ = 0`. Similarly, age-specific summary statistics are obtained by selecting records with `_TYPE_ = 128`, and sex-specific summary data is obtained by

selecting observations with `_TYPE_=64`. Likewise, to get the observation with the interactions of all eight stratifying variables, we select records with `_TYPE_=255`.

4. PRODUCTION JCL: <<intentionally blank>>

4.1 Catalogued Procedure: TRA0 .@MSQ0000 .PQI (PQA2B1)

Input Files:	TRA0 .@MSQ0000 .SAS .PQMRGDNM .MEDPARxx TRA0 .@MSQ0000 .SAS .PQM4DNM .MEDPARxx
Output Files:	TRA0 .@MSQ0000 .SAS .PQSASA2 .MEDPARxx

Purpose: A catalogued procedure that calls the SAS program PQSASA2.

4.1.1 Called Program: TRA0 .@MSQ0000 .PQI (PQSASA2)

Purpose: Create a yearly summary PQI database.

Program Steps:

Step 1: This step creates a combined database of the yearly summary data. Essentially, it is a step to merge all the yearly summary files into one combined file. The summary variables are renamed in the merge process by adding a two-digit suffix. So, TPPQ01, PPPQ01 and OPPQ01 for 1992 will be renamed to TPPQ0192, PPPQ0192, and OPPQ0192, respectively. The process uses the same “by” variables to merge the yearly summary files as the “class” variables used to generate the summary statistics. As a result, the combined file maintains the referential integrity of various stratifications across the years.

5. PRODUCTION JCL: <<intentionally blank>>**5.1 Catalogued Procedure:** <<intentionally blank>>

Input Files: TRA0 . @MSQ0000 . SAS . PQSASA2 . MEDPARxx
Output Files: TRA0 . @MSQ0000 . SAS . PQCOMBN . SUM9201

Purpose: A catalogued procedure that calls the SAS program PQCOMBN.

5.1.1 Called Program: TRA0 . @MSQ0000 . PQI (PQCOMBN)

Purpose: Merge all of the yearly summary files to create a combined database of the yearly summary statistics.

Program Steps:

Step 1:

6. PRODUCTION JCL: <<intentionally blank>>

6.1 Catalogued Procedure: <<intentionally blank>>

Input Files: TRA0 . @MSQ0000 . SAS . PQCOMBN . SUM9201

Purpose: A catalogued procedure that calls the SAS program PQOBSERV.

6.1.1 Called Program: TRA0 . @MSQ0000 . PQI (PQOBSERV)

Purpose: Produce observed rates of PQI summary measures.

Program Steps:

Step 1: For each PQI, we generate tables of observed rates using the combined database of summary PQI statistics in step (6). To generate the observed rates, we select observations with the following values of the `_TYPE_` variable:

<code>_TYPE_</code>	Strata
0	None (overall US)
1	Medicaid Buy-in
2	Medicare Eligibility
4	Race
8	Urban/Rural
16	State
32	Census Region
64	Sex
128	Age groups

Step 2: A `PROC PRINT` of these records in the combined summary database with the above `_TYPE_` produces the following table of observed rates:

TABLE 1

OBSERVED RATES OF PSl_n BY ENROLLEE CHARACTERISTICS

[illegible]

[illegible]

7. PRODUCTION JCL: <<intentionally blank>>**7.1 Catalogued Procedure:** <<intentionally blank>>

Input Files: TRA0 . @MSQ0000 . SAS . PQCOMBN . SUM9201

Purpose: A catalogued procedure that calls the SAS program PQADJUST.

7.1.1 Called Program: TRA0 . @MSQ0000 . PQI (PQADJUST)

Purpose: Produce adjusted rates of PQI summary measures.

Program Steps:

Step 1: We use the method of direct standardization to adjust the observed rates. Except for state-specific PQI rates, we use 18 age-sex cells using FFS population as of July 1999. To do this adjustment, we create a small file of population ratios (cell to overall) for the 18 age-sex cells. We then merge this file with the combined summary file (by age and sex) and compute the weighted (by population ratio) rates. We also create a two-cell and a nine-cell population file for sex-adjusting the age groups, and age-adjusting the sex groups, respectively. These files are merged with the respective summary files to compute the weighted rates for these two groups. We select the subsets of data from the combined database using the following values of the `_TYPE_` variable:

<code>_TYPE_</code>	Strata
192	Age-sex-adjusted rates for overall US
192	Sex-adjusted rates by age groups
192	Age-adjusted rates by gender
196	Age-sex-adjusted rates by race
200	Age-sex-adjusted rates by urban/rural
208	Age-sex-adjusted rates by states
224	Age-sex-adjusted rates by census region
194	Age-sex-adjusted rates by Medicare eligibility
193	Age-sex-adjusted rates by Medicaid buy-in status

Step 2: We sort these subsets by primary strata (e.g. race), and age and sex. The adjusted rates are obtained by summing weighted rates by the primary strata (e.g. race). When there exists no primary strata (e.g. overall us), the subsets are sorted by age and sex, and the adjusted rates are obtained by summing the weighted rates. We age-adjust the observed rates for sex groups, and sex-adjust the observed rates for age groups. To sex-adjust by age group, we sum the weighted rates by age groups. Similarly, to age-adjust the sex, we sum the weighted rates by sex.

Step 3: State-specific adjustment uses eight age-sex cells, instead of 18 age-sex cells. So, the observed rates are recomputed for the revised age-sex groups using the numerator and denominator counts in the combined summary database. After computing the revised observed rates for the state-specific strata, the same method of age-sex adjustment is performed as in 18 age-sex cells above. A hypothetical example with 8 age-sex cells follows:

Age Category	Sex Category	Observed Rate (OPPS0x)	Proportion of FFS Beneficiaries in 1999	Adjusted Rate
<65	Male	.000000	0.08747	0
<65	Female	.009259	0.0666	0.000617
65-74	Male	.004115	0.19764	0.000813
65-74	Female	.045455	0.23849	0.010841
75-84	Male	.007026	0.11677	0.00082
75-84	Female	.066667	0.18292	0.012195
>=85	Male	.041667	0.03049	0.00127
>=85	Female	.029412	0.07962	0.002342
Total		0.203601	1.00	0.028898

Step 4: A PROC PRINT of the records with the adjusted rates for each PQI produces the following table:

TABLE 2
ADJUSTED RATES OF PQIn BY ENROLLEE CHARACTERISTICS

[illegible]

[illegible]

CHAPTER VI

METHODS, FLOWCHARTS, AND

SPECIFICATIONS FOR

HIGH-RISK SURGERIES

PART I: METHODS

1. DESCRIPTION OF THE MEASURE

For the High-Risk Surgeries measure, we present mortality and readmission rates for nine selected medical procedures: Abdominal Aortic Aneurysm Repair, Coronary Artery Bypass Graft, Carotid Endarterectomy, Esophagectomy, Lower Extremity Bypass, Pancreatectomy, Pneumonectomy, Atrial Valve Replacement, and Mitral Valve Replacement. In addition, we pull data for 5 other procedures for possible use in later processing.⁸

The outcomes help us to track the quality of surgical care provided to Medicare patients. Outcomes of the nine procedures may be sensitive to the frequency with which a hospital performs them. Therefore, in addition to reporting mortality and readmissions for each procedure, stratified by state and beneficiary characteristics, we will measure hospital volume for each procedure and we will report outcomes stratified by volume for Esophagectomy, Pancreatectomy and Pneumonectomy.

2. CMS DATA SOURCES

Four sources of data are used to construct the output for the High-Risk Surgeries measure:

- 1) The 1992-2001 MQMS MedPAR claims files prepared by RTI. These intermediate files are produced in the process of making M2/M3 tables.
- 2) The 1992-2001 Cross-Reference files for beneficiaries with a MedPAR claims in the respective year. These files have the listings of all Medicare beneficiary identification numbers (historical IDs) under which the beneficiary has been entitled to receive Medicare benefits. These files allow us to link data across multiple identification numbers, and establish a unique number for each Medicare beneficiary.
- 3) The 1992-2001 MQMS Base Analytic Denominator File with the identification of Medicare beneficiaries who are included in the MQMS. It also provides beneficiary-level demographic and eligibility and enrollment information for analysis by subgroups of interest.
- 4) The 1992-2001 MQMS M1-3 Age and Age/Sex Count file provides the number of Medicare FFS Part A Enrollees on July 1 included in the MQMS, in total, and by subgroups of interest. These counts are used to age/sex adjust MQMS outcomes measures.

⁸ These additional surgical procedures are: Lobectomy, Cystectomy, Nephrectomy, Colectomy, and Gastrectomy. These procedures are included in the SAS code for identifying surgical procedures.

3. INCLUSION CRITERIA

The MedPAR discharge records are included in the High-Risk Surgeries measure if they meet all of the following criteria:

- Discharge is a short-stay acute care hospital claim
- Discharge record is not a duplicate entry in the MedPAR file
- Discharge record in the MedPAR file meets the requirements for the High-Risk Surgeries denominator count.
- The beneficiary belongs to the MQMS M13/M14 Base Analytic Denominator File.

4. EXCLUSION CRITERIA

Claimants are excluded from the High-Risk Surgeries measure if they meet any of the following exclusion criteria:

- Claimants residing outside of the United States, except claimants residing in Puerto Rico, Guam, and the Virgin Islands.
- Claimants with invalid values for date of birth, state code, sex, race, and Medicare status code.

5. DEFINITION OF KEY VARIABLES

Given below are definitions of key variables, in alphabetical order, that are used to report stratified High-Risk Surgeries rates.

- Age Group: The following nine age groupings are used in formatting age and in conducting age/sex adjustments to rates:
 - 1 = 0-54
 - 2 = 55-64
 - 3 = 65-69
 - 4 = 70-74
 - 5 = 75-79
 - 6 = 80-84
 - 7 = 85-89
 - 8 = 90-94
 - 9 = 95+
- Census Region: Beneficiary Census Region of residence as of March 31st of the year following the reference year. Note that the Denominator File is created in

April for the previous calendar year. The March update of the EDB is used to populate the fields for the previous year's Denominator File.

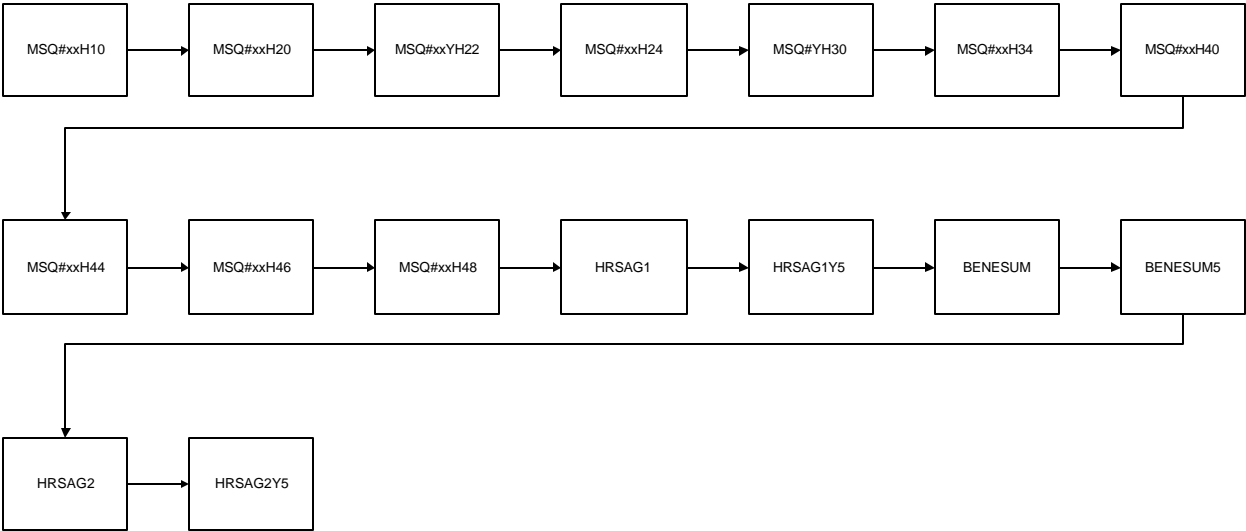
- 0 = Puerto Rico and Virgin Islands
- 1 = Northeast
- 2 = Midwest
- 3 = South
- 4 = West

- Dual Flag: A dichotomous variable that identifies beneficiaries that are dually enrolled in Medicare and Medicaid at least one month during the calendar year, defined as the member being enrolled in Medicare Part A and with Medicaid buy-in at least one month during the calendar year.
 - 1 = Medicare and Medicaid dual enrollment
 - 0 = Not enrolled in Medicaid
- Medicare Status: Original reason for Medicare eligibility
 - 1 = Aged without ESRD
 - 2 = Aged with ESRD
 - 3 = Disabled without ESRD
 - 4 = Disabled with ESRD
 - 5 = ESRD only
- Race: Race of Beneficiary
 - 1 = White
 - 2 = African American
 - 3 = Other (Asian, Hispanic, North American Native, Other)
 - 0 = Unknown
- Sex: Gender of Beneficiary
 - 1 = Male
 - 2 = Female

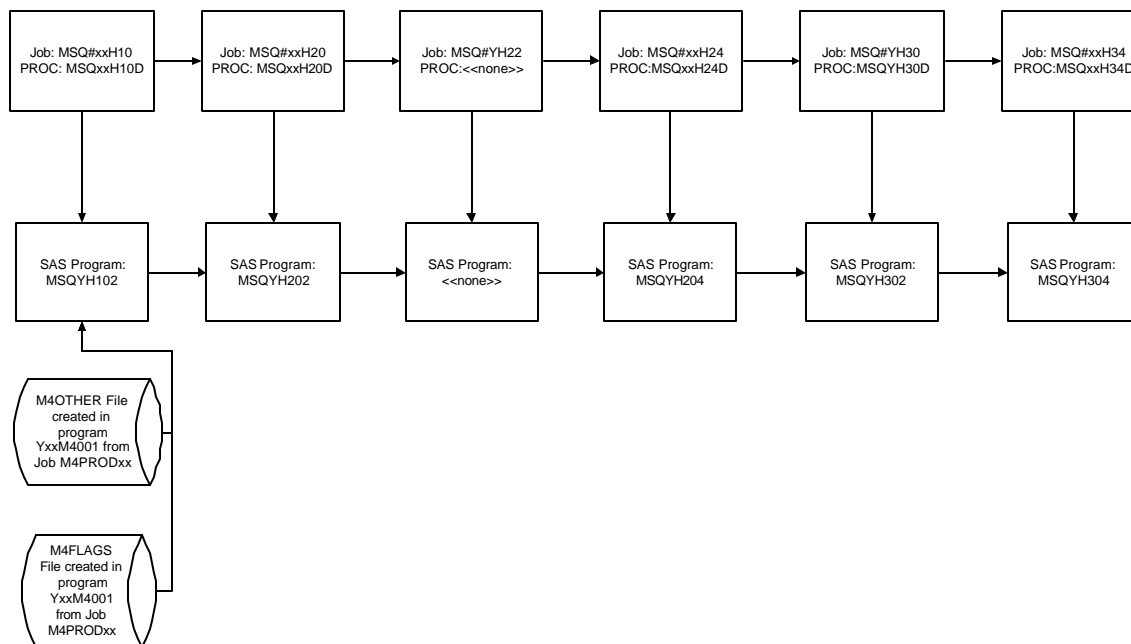
If sex is unknown, PQI software excludes the discharge from the output file.
- State: Beneficiary state of residence as of March 31st of the year following the reference year. Note that the Denominator File is created in April for the previous calendar year. The March update of the EDB is used to populate the fields for the previous year's Denominator File. Residents of Guam will be reported with residents of Hawaii.
- Urban/Rural: A dichotomous variable defining beneficiary county of residence as an urban or rural location. All counties residing within a Metropolitan Statistical Area (MSA) are designated as urban areas.
 - 1 = Urban Area
 - 0 = Rural Area

PART II: FLOWCHARTS

HRS (1)

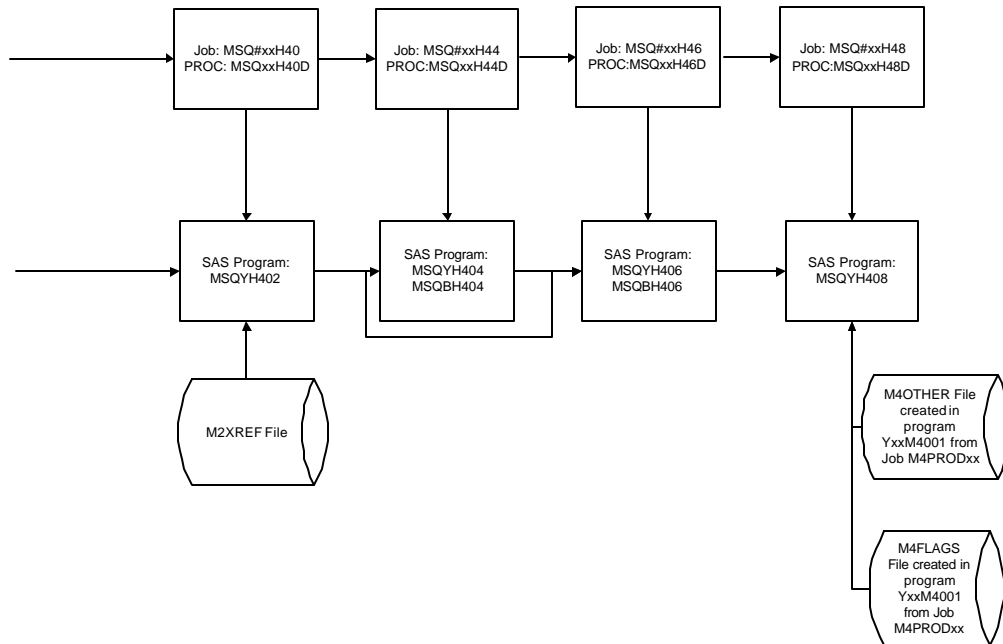


HRS (2)



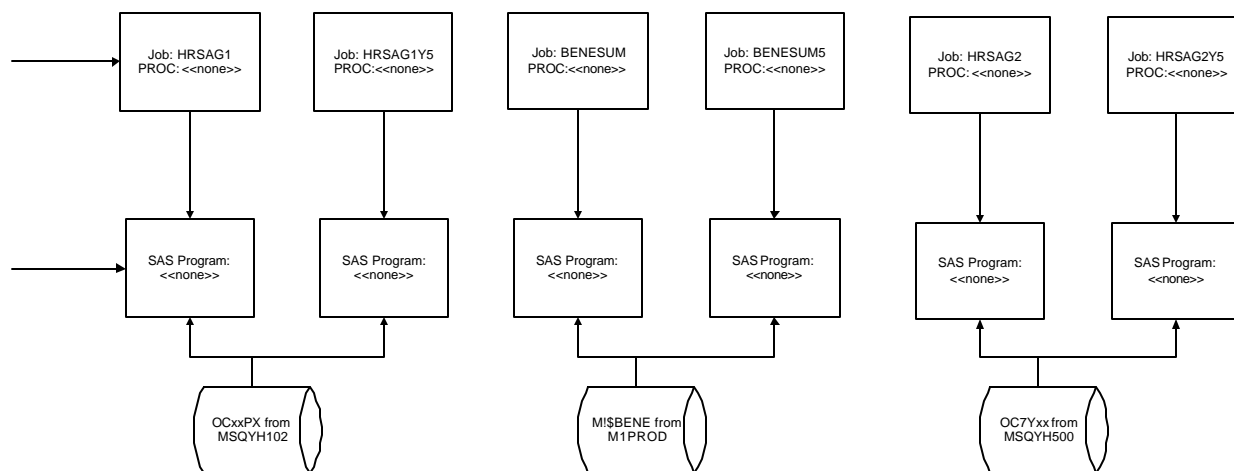
Note: The arrows connecting the Job* boxes represent a sequential flow, while the arrows connecting the Program boxes represent the sharing of input and output data.
 Note: xx=92-01, representing years 1992 through 2001.

HRS (3)



Note: The arrows connecting the Job* boxes represent a sequential flow, while the arrows connecting the Program boxes represent the sharing of input and output data.
Note: xx=92-01, representing years 1992 through 2001.

HRS (4)



Note: The arrows connecting the Job* boxes represent a sequential flow, while the arrows connecting the Program boxes represent the sharing of input and output data.

Note: xx=92-01, representing years 1992 through 2001.

PART III: DATA PROCESSING

1. PRODUCTION JCL: D#MSQ.@MSQ01.JCLTEST(MSQ#yH10)

1.1 Catalogued Procedure: D#MSQ.@MSQ01.PROCLIB(MSQyH10D)

Input Files: D#MSQ.@MSQ0000.SAS.YxxM4xx1.M4FLAGS
 D#MSQ.@MSQ0000.SAS.YxxM4xx1.M4OTHER
 Output Files: D#MSQ.@MSQ01.MSQYH102.OCxxPXR
 D#MSQ.@MSQ01.MSQYH102.VLxxPX

Purpose: A catalogued procedure that calls the SAS program MSQYH102.

1.1.1 Called Program: D#MSQ.@MSQ01.PGMLIB(MSQYH102)

Purpose: Identify selected high-risk surgical procedures.

Program Steps:

Step 1: Read in discharge-level data and identify procedures from diagnosis and procedure codes. Use procedure and diagnosis codes from the discharge records to identify analysis cohorts based on surgical procedures. We evaluate all procedure and diagnosis codes in each discharge record. Code identifying the procedures and outputting a dataset for analysis of outcomes and hospital volumes is taken from Birkmeyer *et al.*, Hospital Volume and Surgical Mortality in the United States, New England Journal of Medicine, 2002; 346: 1128-1137. The minor changes made to the code are: 1) Diagnostic and procedural variable names are changed to match input datasets; 2) We read ten diagnosis codes instead of nine; 3) We commented out the output statement to produce only one outcome file and one volume file each year in order to optimize the program efficiency, 4) We changed the order of the procedures.

Step 2: From each year, output 14 variables for measuring outcomes, one for each procedure. Combining similar procedures, also output 12 variables for measuring volumes. We output records of all hospital stays during which at least one procedure was performed. The logic for identifying procedures differs, depending on whether the record is intended for the outcomes or volume analysis. The 14 procedures are:

- 1) Abdominal aortic aneurysm repair
- 2) Coronary artery bypass graft
- 3) Carotid endarterectomy
- 4) Esophagectomy
- 5) Lower extremity bypass
- 6) Pancreatectomy
- 7) Aortic valve replacement
- 8) Mitral valve replacement
- 9) Pneumonectomy
- 10) Lobectomy
- 11) Colectomy

- 12) Cystectomy
- 13) Gastrectomy
- 14) Nephrectomy

Step 3: In each year's processing, two datasets containing discharges are outputted – one for volume analysis and one for outcomes analysis.

2. PRODUCTION JCL: D#MSQ.@MSQ01.JCLTEST(MSQ#yH20)

2.1 Catalogued Procedure: D#MSQ.@MSQ01.PROCLIB(MSQyH20D)

Input Files: D#MSQ.@MSQ01.MSQYH102.VLxxPX
Output Files: D#MSQ.@MSQ01.MSQYH202.PVLxxALL

Purpose: A catalogued procedure that calls the SAS program MSQYH202.

2.1.1 Called Program: D#MSQ.@MSQ01.PGMLIB(MSQYH202)

Purpose: For each of the 12 procedures, we calculate the number of procedures performed in each year in each hospital in the US.

Program Steps:

Step 1: Use a PROC SUMMARY to calculate the number of procedures performed in each year at each hospital in the US, using the datasets created for volume analysis. Hospitals are identified by PRVID. The result is a file containing hospital volumes, v(t), for each procedure and year.

3. PRODUCTION JCL: <<intentionally blank>>

3.1 Catalogued Procedure: <<intentionally blank>>

Input Files: D#MSQ . @MSQ01 . MSQYH202 . PVLxxALL
Output Files: D#MSQ . @MSQ01 . MSQYH202 . QNTxxMEA

Purpose: A catalogued procedure that calls the SAS program MSQ#YH22.

3.1.1 Called Program: D#MSQ . @MSQ01 . JCLTEST (MSQ#YH22)

Purpose: Combine three years of observations for each hospital and calculate three year moving averages of hospital volumes.

Program Steps:

Step 1: Beginning with the year 1994, combine the current year file with files from the previous two years, linking the files by PROVID.

Step 2: Calculate the average over three-year periods, $V(t) = (v(t-2) + v(t-1) + v(t)) / 3$, for each year from t=1994 to t=2001. This program is written using macro language, so that it is easy to vary the number of years in the average.

4. PRODUCTION JCL: D#MSQ.@MSQ01.JCLTEST(MSQ#yH24)

4.1 Catalogued Procedure: D#MSQ.@MSQ01.PROCLIB(MSQyH24D)

Input Files:	D#MSQ.@MSQ01.MSQYH202.QNTxxMEA
Output Files:	D#MSQ.@MSQ01.MSQYH204.QVxxALL
	D#MSQ.@MSQ01.MSQYH204.QMxxALL

Purpose: A catalogued procedure that calls the SAS program MSQYH204.

4.1.1 Called Program: D#MSQ.@MSQ01.PGMLIB(MSQYH204)

Purpose: Output datasets containing the number of procedures and procedure quintiles. Present the range and mean number of procedures for each year, procedure and quintile.

Program Steps:

Step 1: Estimate the quintiles of the distribution of procedure volumes $V(t)$ for t from 1994 to 2001, weighting each hospital's observation by $V(t)$. Calculate the maximum, minimum, and mean $V(t)$ for each quintile. The maximum and mean for each quintile are reported in TAB2MallPpx and TAB5MallPpx (the template for which can be found in Appendix H).

5. PRODUCTION JCL: D#MSQ.@MSQ01.JCLTEST(MSQ#YH30)**5.1 Catalogued Procedure: D#MSQ.@MSQ01.PROCLIB(MSQYH30D)**

Input Files: D#MSQ.@MSQ01.MSQYH204.QVxxALL
Output Files: D#MSQ.@MSQ01.MSQYH302.QNTxxALL

Purpose: A catalogued procedure that calls the SAS program MSQYH302.

5.1.1 Called Program: D#MSQ.@MSQ01.PGMLIB(MSQYH302)

Purpose: Combine the 12 datasets that contain information on quintiles into one dataset.

Program Steps:

Step 1: Merge the 12 quintile files into one file for each year using the macro MERGE.

Step 2: Execute a PROC PRINT for quality assurance.

6. PRODUCTION JCL: D#MSQ.@MSQ01.JCLTEST(MSQ#yH34)

6.1 Catalogued Procedure: D#MSQ.@MSQ01.PROCLIB(MSQyH34D)

Input Files:	D#MSQ.@MSQ01.MSQYH102.OCxxPXR
	D#MSQ.@MSQ01.MSQYH302.QNT xx ALL
	D#MSQ.@MSQ01.MSQYH302.QNT xx +1ALL
Output Files:	D#MSQ.@MSQ01.MSQYH304.OC2xxALL

Purpose: A catalogued procedure that calls the SAS program MSQYH302.

6.1.1 Called Program: D#MSQ.@MSQ01.PGMLIB(MSQyH304)

Purpose: Merge the outcomes and quintile files, by year.

Program Steps:

Step 1: Merge each year's the outcomes and quintile files by PROVID.

Step 2: Execute a PROC PRINT for quality assurance.

7. PRODUCTION JCL: D#MSQ.@MSQ01.JCLTEST (MSQ#yH40)**7.1 Catalogued Procedure: D#MSQ.@MSQ01.PROCLIB (MSQyH40D)**

Input Files:	D#MSQ.@MSQ0000.SAS.M2XREF.FINDRxx D#MSQ.@MSQ01.MSQYH304.OC2xxALL
Output Files:	D#MSQ.@MSQ01.MSQYH402.OC3Yxx D#MSQ.@MSQ01.MSQYH402.XRFxxALL

Purpose: A catalogued procedure that calls the SAS program MSQYH402.

7.1.1 Called Program: D#MSQ.@MSQ01.PGMLIB (MSQYH402)

Purpose: Identify each member's admission and discharge index record.

Program Steps:

Step 1: Sort each outcome file by HICNO, ADMDATE, and DCHDATE.

Step 2: We then implement the following rules:

- If 2 records for the same HICNO overlap, defined as the second record's ADMDATE is less than or equal to the first record's DCHDATE plus 1 day, then we must keep the first record only, but modify that first record to have the discharge date value of the second, overlapping, record. This first, modified, record is the index admission/discharge record.
- If 2 records for the same HICNO occur but do not overlap, keep only the first record. This first record is the index admission/discharge record.

Step 3: Retain the actual date that the procedure was performed, called the index procedure date. If this date is not readily discernable, set it as equal to the index admission date. Store it on the line of the index admission/discharge record.

Step 4: Produce new finder files containing the master HICNO and YyYHICNO for each year.

Step 5: The output is an outcome dataset for a given year with an index record for each HICNO and procedure. Members with multiple procedures will have multiple index records, one for each procedure.

8. PRODUCTION JCL: D#MSQ.@MSQ01.JCLTEST(MSQ#yH44)

8.1 Catalogued Procedure: D#MSQ.@MSQ01.PROCLIB(MSQyH44D)

Input Files: D#MSQ.@MSQ01.MSQYH402.XRFxxALL
 D#MSQ.@MSQ0000.SAS.YxxM1001.DENOMAxX
 D#MSQ.@MSQ01.MSQYH402.OC3Yxx
 Output Files: D#MSQ.@MSQ01.MSQYH404.OC4Yxx

Purpose: A catalogued procedure that calls the SAS program MSQYH404.

8.1.1 Called Program: D#MSQ.@MSQ01.PGMLIB(MSQYH404)
 D#MSQ.@MSQ01.PGMLIB(MSQBH404)

Purpose: Calculate the HMO entry date.

Program Steps:

Step 1: Use the finder file to cross-match HICNOS in the files produced in 6.1.

Step 2: Extract the date of enrollment for those members who enrolled in Medicare+choice from the current and following year's Denominator files.

Step 3: Select the first enrollment date as the HMO date.

9. PRODUCTION JCL: D#MSQ.@MSQ01.JCLTEST(MSQ#yH46)**9.1 Catalogued Procedure: D#MSQ.@MSQ01.PROCLIB(MSQyH46D)**

Input Files:	D#MSQ.@MSQ01.MSQYH402.XRFxxALL
	D#MSQ.@MSQ0000.SAS.YxxM4001.M4FLAGS
	D#MSQ.@MSQ0000.SAS.Y xx +1M4001.M4FLAGS
	D#MSQ.@MSQ0000.SAS.YxxM4001.M4OTHER
	D#MSQ.@MSQ0000.SAS.Y xx +1M4001.M4OTHER
	D#MSQ.@MSQ01.MSQYH404.OC4Yxx
Output Files:	D#MSQ.@MSQ01.MSQYH406.OC5Yxx

Purpose: A catalogued procedure that calls the SAS program MSQYH406.

9.1.1 Called Program: D#MSQ.@MSQ01.PGMLIB(MSQYH406)
D#MSQ.@MSQ01.PGMLIB(MSQBH406)

Purpose: Calculate readmission date and index death variables.

Program Steps:

Step 1: Use the finder file to cross-match HICNOs in the files produced in 7.1.

Step 2: Extract the date of death and calculate the readmission date for members.

10. PRODUCTION JCL: D#MSQ.@MSQ01.JCLTEST(MSQ#yH48)

10.1 Catalogued Procedure: D#MSQ.@MSQ01.PROCLIB(MSQyH48D)

Input Files:	D#MSQ.@MSQ01.MSQYH402.XRFxxALL D#MSQ.@MSQ0000.SAS.YxxM4001.M4FLAGS D#MSQ.@MSQ0000.SAS.Y xx +1M4001.M4FLAGS D#MSQ.@MSQ0000.SAS.YxxM4001.M4OTHER D#MSQ.@MSQ0000.SAS.Y xx +1M4001.M4OTHER D#MSQ.@MSQ01.MSQYH404.OC4Yxx
Output Files:	D#MSQ.@MSQ01.MSQYH406.OC5Yxx

Purpose: A catalogued procedure that calls the SAS program MSQYH408.

10.1.1 Called Program: D#MSQ.@MSQ01.PGMLIB(MSQYH408)

Purpose: Calculate time to event indicators, defined as:

- **t(R,d):** Time from date of index discharge to readmission for a given procedure: This calculation is measured per procedure as the earliest admission date later than the index discharge date (i.e., the latest readmission date) minus that index discharge date. This calculation is partnered with the censoring time for readmission, measured as the earliest of the following: Date of death, end of the follow-up period, and entry into Medicare+Choice.
- **t(M,a):** Time from date of index admission to date of death for a given procedure: This calculation is measured per procedure as the date of death minus the index admission date. This calculation is partnered with the censoring time for death, measured as the date of index admission to the end of the follow-up period.
- **t(M,p):** Time from index procedure date to date of death: This calculation is measured as the date of death minus the date that the procedure was performed (also called the index procedure date). If the date of death occurs on or before the index discharge date, we will use the information to define inpatient mortality by setting the calculation value to 0. This calculation is partnered with the censoring time measured as the date of the end of the follow-up period minus the index procedure date.

Program Steps:

Step 1: Recode the index procedure date -- If the index procedure date is later than the index discharge date or earlier than the index admission date, then set the index procedure date equal to the index admission date.

Step 2: Create the index readmission date variable -- the earliest admission date later than the index discharge date (i.e., the latest readmission date)

Step 3: Create the $t(R,d)$ calculation -- measured per procedure as the earliest admission date later than the index discharge date (i.e., the latest readmission date) minus that index discharge date.

Step 4: Create the $t(M,p)$ calculation -- measured as the date of death minus the index procedure date. If the date of death occurs on or before the index discharge date, we use the information to define inpatient mortality by setting the calculation value to 0.

Step 5: Create the $t(M,a)$ calculation -- measured per procedure as the date of death minus the index admission date.

Step 6: Calculate the censoring times that partner with the time to event calculations. First, calculate the `CRDDATE` variable as the earliest of the date of death or the HMO enrollment date. Next, calculate the date of inpatient death where possible. Finally, calculate the censoring times.

Step 7: Combine the calculations by procedure into one dataset.

Step 8: Check output through a `PROC MEANS`, `PROC CONTENTS`, and `PROC PRINT`.

11. PRODUCTION JCL: <<intentionally blank>>**11.1 Catalogued Procedure:** <<intentionally blank>>

Input Files: D#MSQ . @MSQ01 . MSQYH102 . OCxxPX, (xx=92-01)
Output Files: D#MSQ . @MSQ01 . MSQYH202 . OCxxSUM, (xx=94-01)

Purpose: A catalogued procedure that calls the SAS program HRSAG1.

11.1.1 Called Program: P1H4 . @MSQ0HRS . PGMLIB (HRSAG1)

Purpose: Produce aggregate files that contain counts of discharges with High-Risk Surgeries. Sum the data for three years to the level of age, sex, race, dual, Medicare status, urban/rural, and beneficiary region and state.

Program Steps:

Step 1: Aggregate the data across all stratifiers for each year.

Step 2: Pull and sum three-year outcome counts.

12. PRODUCTION JCL: <<intentionally blank>>**12.1 Catalogued Procedure:** <<intentionally blank>>

Input Files: D#MSQ . @MSQ01 . MSQYH102 . OCxxPX, (xx=92-01)
Output Files: D#MSQ . @MSQ01 . MSQYH202 . OCxxSUM5, (xx=96-01)

Purpose: A catalogued procedure that calls the SAS program HRSAG1Y5.

12.1.1 Called Program: P1H4 . @MSQ0HRS . PGMLIB (HRSAG1Y5)

Purpose: Produce aggregate files that contain counts of discharges with High-Risk Surgeries. Sum the data for five years to the level of age, sex, race, dual, Medicare status, urban/rural, and beneficiary region and state.

Program Steps:

Step 1: Aggregate the data across all stratifiers for each year.

Step 2: Pull and sum five-year outcome counts.

13. PRODUCTION JCL: <<intentionally blank>>**13.1 Catalogued Procedure:** <<intentionally blank>>

Input Files: D#MSQ.@MSQ00000.SAS.YxxM1AG1.M14BENE,
(yy=92-01)
Output Files: D#MSQ.@MSQ01.MSQYH202.BENxxSUM, (xx=94-01)

Purpose: A catalogued procedure that calls the SAS program BENESUM.

13.1.1 Called Program: P1H4.@MSQ0HRS.PGMLIB(BENESUM)

Purpose: Produce denominator aggregate files that combine three years of beneficiary counts (for discharge rate computation) by level of age, sex, race, dual, Medicare status, urban/rural, and beneficiary region and state.

Program Steps:

Step 1: Aggregate the data across all stratifiers for each year.

Step 2: Pull and sum three-year counts.

14. PRODUCTION JCL: <<intentionally blank>>**14.1 Catalogued Procedure:** <<intentionally blank>>

Input Files: D#MSQ.@MSQ00000.SAS.YxxM1AG1.M14BENE, (xx=92-01)
Output Files: D#MSQ.@MSQ01.MSQYH202.BENxxSU5, (xx=96-01)

Purpose: A catalogued procedure that calls the SAS program BENESUM5.

14.1.1 Called Program: P1H4.@MSQ0HRS.PGMLIB(BENESUM5)

Purpose: Produce denominator aggregate files that combine five years of beneficiary counts (for discharge rate computation) by level of age, sex, race, dual, Medicare status, urban/rural, and beneficiary region and state.

Program Steps:

Step 1: Aggregate the data across all stratifiers for each year.

Step 2: Pull and sum five-year counts.

15. PRODUCTION JCL: <<intentionally blank>>**15.1 Catalogued Procedure:** <<intentionally blank>>

Input Files: D#MSQ . @MSQ01 . MSQYH500 . OC7Yxx . OLD, (xx=92-01)

Output Files: D#MSQ . @MSQ01 . MSQYH502 . RMxxSUM, (xx=94-01)

Purpose: A catalogued procedure that calls the SAS program HRSAG2.

15.1.1 Called Program: P1H4 . @MSQ0HRS . PGMLIB (HRSAG2)

Purpose: Produce denominator aggregate files that contain counts of readmissions and deaths for High-Risk Surgeries. Sum the data for three years to the level of age, sex, race, dual, Medicare status, urban/rural, and beneficiary region and state.

Program Steps:

Step 1: Aggregate the data across all stratifiers for each year.

Step 2: Pull and sum three-year counts.

16. PRODUCTION JCL: <<intentionally blank>>**16.1 Catalogued Procedure:** <<intentionally blank>>

Input Files: D#MSQ . @MSQ01 . MSQYH500 . OC7Yxx . OLD, (xx=92-01)
Output Files: D#MSQ . @MSQ01 . MSQYH502 . RMxxSUM5, (xx=96-01)

Purpose: A catalogued procedure that calls the SAS program HRSAG2Y5.

16.1.1 Called Program: P1H4 . @MSQ0HRS . PGMLIB (HRSAG2Y5)

Purpose: Produce denominator aggregate files that contain counts of readmissions and deaths for High-Risk Surgeries. Sum the data for five years to the level of age, sex, race, dual, Medicare status, urban/rural, and beneficiary region and state.

Program Steps:

Step 1: Aggregate the data across all stratifiers for each year.

Step 2: Pull and sum five-year counts.

CHAPTER VII

METHODS, FLOWCHARTS, AND

SPECIFICATIONS FOR DIABETES

PART I: METHODS

1. DESCRIPTION OF THE MEASURE

These measures are based on a combination of ICD-9 CM diagnosis and procedure codes, HCPCS codes, revenue center codes, and provider specialty codes and document the count and rate per 1,000 diabetes claimants who have at least one claim indicating evidence of one of 8 process of care measures or one of 34 progression of disease measures. The process of care and progression of disease measures are described in detail in Appendices F and G, respectively. Annual summary tables produced for the measure present aggregate counts, unadjusted rates, and age/sex adjusted rates for each measure in total and stratified by demographic subgroups, including age group, sex, race, Medicare eligibility status, Medicaid enrollment status, and geographic area.

The following is a list of the Process of Care and Progression of Disease Measures:

Process of Care Measures

- Hemoglobin A1c Test
- Lipid Profiling
- Self-monitoring
- Diabetes Education
- Retinal Eye Examination
- Microalbumin Screening/Quantitative Urine Protein
- Podiatry Visits
- Therapeutic Shoes

Progress of Disease Measures

- Lower Extremity Disease, cellulitis as a principal diagnosis
- Lower Extremity Disease, cellulitis as a secondary diagnosis
- Lower Extremity Disease, cutaneous gangrene
- Lower Extremity Disease, osteomyelitis
- Lower Extremity Disease, peripheral neuropathy or arthropathy associated with neurological disorders
- Lower Extremity Disease, diabetes with peripheral circulatory disorders

- Lower Extremity Disease, lower limb amputations
- Lower Extremity Disease, incision and drainage below fascia, with or without tendon sheath involvement
- Lower Extremity Disease, incision and drainage of bone cortex
- Lower Extremity Disease, skin and subcutaneous debridement for gangrene
- New End-Stage Renal Disease (ESRD)
- Nephropathy
- Diabetic Eye Disease, retinopathy
- Diabetic Eye Disease, blindness
- Diabetic Eye Disease, diabetic cataract
- Diabetic Eye Disease, glaucoma
- Diabetic Eye Disease, macular edema
- Diabetic Eye Disease, laser treatment
- Hospitalization for Stroke as a principal diagnosis
- Hospitalization for Stroke as a secondary diagnosis
- Hospitalization for Acute Myocardial Infarction as a principal diagnosis
- Hospitalization for Acute Myocardial Infarction as a secondary diagnosis
- Hospitalization for Heart Failure as a principal diagnosis
- Hospitalization for Heart Failure as a secondary diagnosis
- Hospitalization for CABG
- Hospitalization for PTCA
- Admission to an Emergency Room or Observation Bed for Metabolic Crisis
- Hospitalization for Diabetes without mention of complications
- Hospitalization for Diabetes with ketoacidosis

-
- Hospitalization for Diabetes with hyperosmolarity
 - Hospitalization for Diabetes with other coma
 - Hospitalization for Diabetes with other complications
 - Hospitalization for Lower Extremity Amputations
 - Hospitalization for Femoral-Bypass Procedure

2. CMS DATA SOURCES

- The 5% Standard Analytical Files (SAF) extracted from DESY, including Inpatient (IP), Skilled Nursing Facilities (SNF), Home Health Agencies (HHA), Outpatient (OP), Part B Carriers (PS), and Durable Medical Equipment (DME) claims files, provide claim information for beneficiaries included in the 1992-2002 MQMS.
- The CMS Cross-Reference File accessed through DSAF provides a listing of all Medicare beneficiary identification numbers (historical IDs) under which the beneficiary has been entitled to receive Medicare benefits. This file allows one to link across multiple identification numbers and establishes a unique number for each Medicare beneficiary.
- The 1992-2002 MQMS M1 Base Analytic Denominator File provides the identification of Medicare beneficiaries who are included in the MQMS and who are eligible for diabetes selection. It also provides beneficiary-level demographic and eligibility and enrollment information for analysis by subgroups of interest.
- The 1999 Final MQMS M1-3 Age and Age/Sex Count File provides the number of Medicare FFS Part A Enrollees on July 1 included in the MQMS, in total, and by subgroups of interest. These counts are used to age/sex adjust MQMS outcomes measures to the 1999 Medicare FFS population.

3. INCLUSION CRITERIA

Claimants are included in the diabetes cohort if they meet all of the following inclusion criteria:

- Claimants eligible for M7 based on the M1 Base Analytic Denominator File diabetes eligibility indicator. M1 sample is restricted to those individuals who were enrolled in Medicare Parts A and B for the full twelve months of the calendar year and who did not participate in a Medicare Managed Care plan during the year.

- Claimants with principal or secondary diagnosis of diabetes. Diagnosis codes consistent with diabetes include 250*, 3572*, 3620*, and 36641 (where * stands for any code at the fourth or fifth position).
- Claimants with (1) at least one acute face-to-face claim, or (2) at least two non-acute face-to-face claims. Acute and non-acute face-to-face claims are identified based on revenue center and HCPCS codes (For detail, refer to Appendix I).

4. EXCLUSION CRITERIA

Claimants are excluded from the diabetes cohort if they meet any of the following exclusion criteria:

- Claimants residing outside of the United States, except claimants residing in Puerto Rico, Guam, and the Virgin Islands.
- Claimants with invalid values for date of birth, state code, sex, race, and Medicare status code.
- Claimants with evidence of diabetes in pregnancy (indicated by a diagnosis code of 6480* or 6488*, where * stands for any code at the fifth position). The number of claimants excluded for this reason and a total number of eligible diabetes claimants that meet all of the inclusion and exclusion criteria for years 1992-2001 based on 5% SAF files are presented in the table below.

5. KEY VARIABLES

Age Group: The following nine age groupings are used for formatting age (which is calculated as of July 1 for each calendar year) and in conducting age/sex adjustments to rates:

- 1 = 0-54
- 2 = 55-64
- 3 = 65-69
- 4 = 70-74
- 5 = 75-79
- 6 = 80-84
- 7 = 85-89
- 8 = 90-94
- 9 = 95+

Census Division: Beneficiary Census Division of residence as of March 31st of the year following the reference year. Note that the Denominator File is created in April for the previous calendar year. The March update of the Enrollment Data Base (EDB) is used to populate the fields for the previous year's Denominator File.

- 0 = Puerto Rico and Virgin Islands

- 1 = New England
- 2 = Middle Atlantic
- 3 = East North Central
- 4 = West North Central
- 5 = South Atlantic
- 6 = East South Central
- 7 = West South Central
- 8 = Mountain
- 9 = Pacific

Census Region: Beneficiary Census Region of residence as of March 31st of the year following the reference year. Note that the Denominator File is created in April for the previous calendar year. The March update of the EDB is used to populate the fields for the previous year's Denominator File.

- 0 = Puerto Rico and Virgin Islands
- 1 = Northeast
- 2 = Midwest
- 3 = South
- 4 = West

Dual Flag: A dichotomous variable that identifies beneficiaries that are dually enrolled in Medicare and Medicaid at least one month during the calendar year, defined as the member being enrolled in Medicare Part A and with Medicaid buy-in at least one month during the calendar year.

- 1 = Medicare and Medicaid dual enrollment
- 0 = Not enrolled in Medicaid

Medicare Status: Original reason for Medicare eligibility

- 1 = Aged without ESRD
- 2 = Aged with ESRD
- 3 = Disabled without ESRD
- 4 = Disabled with ESRD
- 5 = ESRD only

Race: Race of Beneficiary

- 1 = White
- 2 = African American
- 3 = Other (Asian, Hispanic, North American Native, Other)
- 0 = Unknown

Sex: Gender of Beneficiary

- 1 = Male
- 2 = Female

Note: If sex is unknown, CMS assigns a value using the following methodology: SEX = 1, if beneficiary age <65 and SEX = 2, if beneficiary age is 65 or greater

State: Beneficiary state of residence as of March 31st of the year following the reference year. Note that the Denominator File is created in April for the previous calendar year. The March update of the EDB is used to populate the fields for the previous year's Denominator File. Residents of Guam will be reported with residents of Hawaii.

Urban/Rural: A dichotomous variable defining beneficiary county of residence as an urban or rural location. All counties residing within a Metropolitan Statistical Area (MSA) are designated as urban areas.

1 = Urban Area

0 = Rural Area

PART III: DATA PROCESSING

Please note that prior to processing any code, data must be obtained from DESY. Use DESY to pull all diabetes-related claims that occurred during the relevant year, based on the 5% HHA, IP, OP, PS, and SNF files. Please refer to Appendix B for a comprehensive listing of this DESY output.

1. PRODUCTION JCL: <<intentionally blank>>

1.1 Catalogued Procedure: <<intentionally blank>>

Input File: P#DSY.@AAA2049.WF17.@-----.R0008819.OUT
Output File: D#MSQ.@MSQ00M7.SAS.A001HH.HH99
D#MSQ.@MSQ00M7.SAS.A001HH.HHID99

Purpose: A catalogued procedure that calls the SAS program.

1.1.1 Called Program: D#MSQ.@MSQ00M7.PGMLIB99(A001HH)

Purpose: Read the DESY HH file into a SAS file, generate a claims-level file, and generate a file with unduplicated HICNOS for cross-referencing.

Program Steps:

Step 1: Read in the flat HH file, keep only the necessary variables for identifying diabetes later and write-out a SAS file.

Step 2: Run a PROC CONTENTS and a PROC PRINT on the SAS claim files.

Step 3: Create a file with HICNOS for a finder file, and run a PROC PRINT.

2. PRODUCTION JCL: <<intentionally blank>>

2.1 Catalogued Procedure: <<intentionally blank>>

Input File: P#DSY.@AAA2049.WF17.@-----.R0008817.OUT
Output File: D#MSQ.@MSQ00M7.SAS.A001IP.IP99
D#MSQ.@MSQ00M7.SAS.A001IP.IPID99

Purpose: A catalogued procedure that calls the SAS program.

2.1.1 Called Program: D#MSQ.@MSQ00M7.PGMLIB99(A001IP)

Purpose: Read the DESY IP file into a SAS file, generate a claims-level file, and generate a file with unduplicated HICNOS for cross-referencing.

Program Steps:

Step 1: Read in the flat IP file, keep only the necessary variables for identifying diabetes later and write-out a SAS file.

Step 2: Run a PROC CONTENTS and a PROC PRINT on the SAS claim files.

Step 3: Create a file with HICNOS for a finder file, and run a PROC PRINT.

3. PRODUCTION JCL: <<intentionally blank>>

3.1 Catalogued Procedure: <<intentionally blank>>

Input File: P#DSY.@AAA2049.WF17.@-----.R0008815.OUT
Output File: D#MSQ.@MSQ00M7.SAS.A001OP.OP99
D#MSQ.@MSQ00M7.SAS.A001OP.OPID99

Purpose: A catalogued procedure that calls the SAS program.

3.1.1 Called Program: D#MSQ.@MSQ00M7.PGMLIB99(A001OP)

Purpose: Read the DESY OP file into a SAS file, generate a claims-level file, and generate a file with unduplicated HICNOS for cross-referencing.

Program Steps:

Step 1: Read in the flat OP file, keep only the necessary variables for identifying diabetes later and write-out a SAS file.

Step 2: Run a PROC CONTENTS and a PROC PRINT on the SAS claim files.

Step 3: Create a file with HICNOS for a finder file, and run a PROC PRINT.

4. PRODUCTION JCL: <<intentionally blank>>

4.1 Catalogued Procedure: <<intentionally blank>>

Input File: P#DSY.@AAA2049.WF17.@-----.R0008810.OUT
Output File: D#MSQ.@MSQ00M7.SAS.A001PS.PS99
D#MSQ.@MSQ00M7.SAS.A001PS.PSID99

Purpose: A catalogued procedure that calls the SAS program.

4.1.1 Called Program: D#MSQ.@MSQ00M7.PGMLIB99(A001PS)

Purpose: Read the DESY PS file into a SAS file, generate a claims-level file, and generate a file with unduplicated HICNOS for cross-referencing.

Program Steps:

Step 1: Read in the flat PS file, keep only the necessary variables for identifying diabetes later and write-out a SAS file.

Step 2: Run a PROC CONTENTS and a PROC PRINT on the SAS claim files.

Step 3: Create a file with HICNOS for a finder file, and run a PROC PRINT.

5. PRODUCTION JCL: <<intentionally blank>>**5.1 Catalogued Procedure:** <<intentionally blank>>

Input File: P#DSY.@AAA2049.WF17.@-----.R0009974.OUT
Output File: D#MSQ.@MSQ00M7.SAS.A001SN.SN99
D#MSQ.@MSQ00M7.SAS.A001SN.SNID99

Purpose: A catalogued procedure that calls the SAS program.

5.1.1 Called Program: D#MSQ.@MSQ00M7.PGMLIB99(A001SN)

Purpose: Read the DESY SN file into a SAS file, generate a claims-level file, and generate a file with unduplicated HICNOS for cross-referencing.

Program Steps:

Step 1: Read in the flat SN file, keep only the necessary variables for identifying diabetes later and write-out a SAS file.

Step 2: Run a PROC CONTENTS and a PROC PRINT on the SAS claim files.

Step 3: Create a file with HICNOS for a finder file, and run a PROC PRINT.

6. PRODUCTION JCL: <<intentionally blank>>**6.1 Catalogued Procedure:** <<intentionally blank>>

Input File: D#MSQ.@MSQ00M7.SAS.A001HH.HHID99
 D#MSQ.@MSQ00M7.SAS.A001IP.IPID99
 D#MSQ.@MSQ00M7.SAS.A001OP.OPID99
 D#MSQ.@MSQ00M7.SAS.A001PS.PSID99
 D#MSQ.@MSQ00M7.SAS.A001SN.SNID99
Output File: D#MSQ.@MSQ00M7.FLAT.A002.FINDER99

Purpose: A catalogued procedure that calls the SAS program.

6.1.1 Called Program: D#MSQ.@MSQ00M7.PGMLIB99(A002)

Purpose: Read in the five A001 files and generate a flat finder file.

Program Steps:

Step 1: Read in the five SAS files (HH, IP OP, PS, SN) and sort by HICNO, deleting all observations with duplicate keys.

Step 2: Create a flat finder file for use in cross-referencing.

Get DSAF cross-reference file

Output: WF17.@0000000.DIABXX.OUTPUT.NODUPE - 1992-2000
 WF17.@0000000.xref2001.OUTPUT.NODUPE - 2001

7. PRODUCTION JCL: <<intentionally blank>>

7.1 Catalogued Procedure: <<intentionally blank>>

Input File: DSAF cross-reference flat file
Output File: D#MSQ.@MSQ00M7.SAS.A003.XREF99

Purpose: A catalogued procedure that calls the SAS program.

7.1.1 Called Program: D#MSQ.@MSQ00M7.PGMLIB99(A003)

Purpose: Read in the DSAF cross-reference file and create a SAS file.

Program Steps:

Step 1: Read in the flat cross-reference file.

Step 2: Sort the data by XREF and output as a SAS file.

Step 3: Run a PROC CONTENTS and a PROC PRINT on the SAS file.

Step 4: Output unique claimants into a temporary dataset.

8. PRODUCTION JCL: <<intentionally blank>>

8.1 Catalogued Procedure: <<intentionally blank>>

Input File: D#MSQ.@MSQ00M7.SAS.A001HH.HH99
 D#MSQ.@MSQ00M7.SAS.A003.XREF99
Output File: D#MSQ.@MSQ00M7.SAS.B004HH.DB99HH2

Purpose: A catalogued procedure that calls the SAS program.

8.1.1 Called Program: D#MSQ.@MSQ00M7.PGMLIB99(B004HH)

Purpose: Assign a unique HICNO to claims for the same claimant, and identify non-acute face-to-face claims.

Program Steps:

Step 1: Sort the HHA file.

Step 2: Merge the HHA file with the cross-reference file to assign a unique HICNO to each claimant.

Step 3: Sort the HHA file again by the assigned unique HICNO.

Step 4: Identify non-acute face-to-face claims, two of which are required to qualify a claimant as having diabetes.

Step 5: Run a PROC CONTENTS and a PROC PRINT on the SAS non-acute claims file.

9. PRODUCTION JCL: <<intentionally blank>>**9.1 Catalogued Procedure:** <<intentionally blank>>

Input File: D#MSQ.@MSQ00M7.SAS.A001IP.HH99
 D#MSQ.@MSQ00M7.SAS.A003.XREF99
Output File: D#MSQ.@MSQ00M7.SAS.B004IP.DB99IP1

Purpose: A catalogued procedure that calls the SAS program.

9.1.1 Called Program: D#MSQ.@MSQ00M7.PGMLIB99(B004IP)

Purpose: Assign a unique HICNO to claims for the same claimant, and stratify claims into acute and non-acute face-to-face claims. Please note that IP hospital is considered acute.

Program Steps:

Step 1: Sort the IP file.

Step 2: Merge the IP file with the cross-reference file to assign a unique HICNO to each claimant.

Step 3: Sort the IP file again by the assigned unique HICNO.

Step 4: Stratify claims into acute and non-acute face-to-face claims. One acute claim or two non-acute claims are required to qualify a claimant as diabetic.

Step 5: Run a PROC CONTENTS and a PROC PRINT on the SAS non-acute claims file.

10. PRODUCTION JCL: <<intentionally blank>>**10.1 Catalogued Procedure:** <<intentionally blank>>

Input File: D#MSQ.@MSQ00M7.SAS.A001OP.OP99
 D#MSQ.@MSQ00M7.SAS.A003.XREF99
Output File: D#MSQ.@MSQ00M7.SAS.B004OP.DB99OP1
 D#MSQ.@MSQ00M7.SAS.B004OP.DB99OP2

Purpose: A catalogued procedure that calls the SAS program.

10.1.1 Called Program: D#MSQ.@MSQ00M7.PGMLIB99(B004OP)

Purpose: Assign a unique HICNO to claims for the same claimant, and stratify claims into acute and non-acute face-to-face claims.

Program Steps:

Step 1: Sort the OP file.

Step 2: Merge the OP file with the cross-reference file to assign a unique HICNO to each claimant.

Step 3: Sort the OP file again by the assigned unique HICNO.

Step 4: Stratify claims into acute and non-acute face-to-face claims. One acute claim or two non-acute claims are required to qualify a claimant as diabetic.

Step 5: Run a PROC CONTENTS and a PROC PRINT on the SAS claims files.

11. PRODUCTION JCL: <<intentionally blank>>**11.1 Catalogued Procedure: <<intentionally blank>>**

Input File: D#MSQ.@MSQ00M7.SAS.A001PS.PS99
 D#MSQ.@MSQ00M7.SAS.A003.XREF99
Output File: D#MSQ.@MSQ00M7.SAS.B004PS.DB99PS1
 D#MSQ.@MSQ00M7.SAS.B004PS.DB99PS2

Purpose: A catalogued procedure that calls the SAS program.

11.1.1 Called Program: D#MSQ.@MSQ00M7.PGMLIB99(B004PS)

Purpose: Assign a unique HICNO to claims for the same claimant, and stratify claims into acute and non-acute face-to-face claims.

Program Steps:

Step 1: Sort the Part B Physician File.

Step 2: Merge the Part B Physician File with the cross-reference file to assign a unique HICNO to each claimant.

Step 3: Sort the Part B Physician File again by the assigned unique HICNO.

Step 4: Stratify claims into acute and non-acute face-to-face claims. One acute claim or two non-acute claims are required to qualify a claimant as diabetic.

Step 5: Run a PROC CONTENTS and a PROC PRINT on the SAS claims files.

12. PRODUCTION JCL: <<intentionally blank>>**12.1 Catalogued Procedure:** <<intentionally blank>>

Input File: D#MSQ.@MSQ00M7.SAS.A001SN.SN99
 D#MSQ.@MSQ00M7.SAS.A003.XREF99
Output File: D#MSQ.@MSQ00M7.SAS.B004SN.DB99SN2

Purpose: A catalogued procedure that calls the SAS program.

12.1.1 Called Program: D#MSQ.@MSQ00M7.PGMLIB99(B004SN)

Purpose: Assign a unique HICNO to claims for the same claimant, and identify non-acute face-to-face claims.

Program Steps:

Step 1: Sort the SNF file.

Step 2: Merge the SNF file with the cross-reference file to assign a unique HICNO to each claimant.

Step 3: Sort the SNF file again by the assigned unique HICNO.

Step 4: Identify non-acute face-to-face claims, two of which are required to qualify a claimant as having diabetes.

Step 5: Run a PROC CONTENTS and a PROC PRINT on the SAS non-acute claims file.

13. PRODUCTION JCL: <<intentionally blank>>**13.1 Catalogued Procedure: <<intentionally blank>>**

Input File:	D#MSQ.@MSQ00M7.SAS.B004IP.DB99IP1
	D#MSQ.@MSQ00M7.SAS.B004OP.DB99OP1
	D#MSQ.@MSQ00M7.SAS.B004PS.DB99PS1
	D#MSQ.@MSQ00M7.SAS.B004SN.DB99SN2
	D#MSQ.@MSQ00M7.SAS.B004OP.DB99OP2
	D#MSQ.@MSQ00M7.SAS.B004HH.DB99HH2
	D#MSQ.@MSQ00M7.SAS.B004PS.DB99PS2
	D#MSQ.@MSQ0000.SAS.Y99M1002.DENOMB99
	D#MSQ.@MSQ00M7.SAS.A003.XREF99
Output File:	D#MSQ.@MSQ00M7.SAS.FLAT.B005.DIAB99
	D#MSQ.@MSQ00M7.SAS.FLAT.B005.DIABET99

Purpose: A catalogued procedure that calls the SAS program.

13.1.1 Called Program: D#MSQ.@MSQ00M7.PGMLIB99(B005)

Purpose: Consolidate all acute and non-acute claims from IP, SNF, OP, HHA, and PS. Identify diabetes cohort using the following criteria: one acute face-to-face claim or two non-acute face-to-face claims at least seven days apart.

Program Steps:

Step 1: Combine acute claims files and output one HICNO for each claimant.

Step 2: Combine all non-acute claims files into one file.

Step 3: Sort the combined non-acute claims file.

Step 4: Apply “two claims seven days apart” criteria and output one HICNO for each of those claimants who meet the criteria.

Step 5: Combine acute diabetes HICNOs with non-acute diabetes HICNOs to get the tentative diabetes cohort.

Step 6: Merge the cross-reference file with the Base Denominator Analytic File, to cover the event that a HICNO changes, before the merge with the tentative diabetes cohort.

Step 7: Sort by HICNO, before merge with the tentative diabetes cohort.

Step 8: Merge the tentative diabetes cohort with the Base Analytic Denominator File members who are eligible for M7 selection to get the final diabetes cohort.

Step 9: Sort the cross-reference file by HICNO, and then merge the diabetes cohort file with the sorted cross-reference file in order to obtain historical HICNOs for use in the finder file.

Step 10: Create a flat finder file for use in pulling all claims using DESY.

Step 11: Create a SAS file containing the tentative diabetes cohort, just in case it is needed in the future.

14. PRODUCTION JCL: <<intentionally blank>>**14.1 Catalogued Procedure:** <<intentionally blank>>

Input File: P#DSY.@AAA2049.WF17.@-----.R0009817.OUT
Output File: D#MSQ.@MSQ00M7.SAS.C006DM.Y99DMCLM

Purpose: A catalogued procedure that calls the SAS program.

14.1.1 Called Program: D#MSQ.@MSQ00M7.PGMLIB99(C006DM)

Purpose: Read in the DME raw claims data and generate flags for process and progression of disease measures on the fly.

Program Steps:

Step 1: Read-in the DME claims.

Step 2: Generate process and progression of disease measure flags.

Step 3: Run a PROC CONTENTS and a PROC PRINT on the SAS claims file.

15. PRODUCTION JCL: <<intentionally blank>>**15.1 Catalogued Procedure:** <<intentionally blank>>

Input File: P#DSY.@AAA2049.WF17.@----- .R0009819.OUT
Output File: D#MSQ.@MSQ00M7.SAS.C006HH.Y99HHCLM

Purpose: A catalogued procedure that calls the SAS program.

15.1.1 Called Program: D#MSQ.@MSQ00M7.PGMLIB99(C006HH)

Purpose: Read in the HHA raw claims data and generate flags for process and progression of disease measures on the fly.

Program Steps:

Step 1: Read-in the HHA claims.

Step 2: Generate process and progression of disease measure flags.

Step 3: Run a PROC CONTENTS and a PROC PRINT on the SAS claims file.

16. PRODUCTION JCL: <<intentionally blank>>**16.1 Catalogued Procedure:** <<intentionally blank>>

Input File: P#DSY.@AAA2049.WF17.@----- .R0009815.OUT
Output File: D#MSQ.@MSQ00M7.SAS.C006IP.Y99IPCLM

Purpose: A catalogued procedure that calls the SAS program.

16.1.1 Called Program: D#MSQ.@MSQ00M7.PGMLIB99(C006IP)

Purpose: Read in the IP Hospital raw claims data and generate flags for process and progression of disease measures on the fly.

Program Steps:

Step 1: Read-in the IP Hospital claims.

Step 2: Generate process and progression of disease measure flags.

Step 3: Run a PROC CONTENTS and a PROC PRINT on the SAS claims file.

17. PRODUCTION JCL: <<intentionally blank>>**17.1 Catalogued Procedure:** <<intentionally blank>>

Input File: P#DSY.@AAA2049.WF17.@-----.R0009820.OUT
Output File: D#MSQ.@MSQ00M7.SAS.C006OP.Y99OPCLM

Purpose: A catalogued procedure that calls the SAS program.

17.1.1 Called Program: D#MSQ.@MSQ00M7.PGMLIB99(C006OP)

Purpose: Read in the Outpatient Hospital raw claims data and generate flags for process and progression of disease measures on the fly.

Program Steps:

Step 1: Read-in the OP Hospital claims.

Step 2: Generate process and progression of disease measure flags.

Step 3: Run a PROC CONTENTS and a PROC PRINT on the SAS claims file.

18. PRODUCTION JCL: <<intentionally blank>>**18.1 Catalogued Procedure:** <<intentionally blank>>

Input File: P#DSY.@AAA2049.WF17.@-----.R0009816.OUT
Output File: D#MSQ.@MSQ00M7.SAS.C006PS.Y99PSCLM

Purpose: A catalogued procedure that calls the SAS program.

18.1.1 Called Program: D#MSQ.@MSQ00M7.PGMLIB99(C006PS)

Purpose: Read in the Part B Carrier (Physician) raw claims data and generate flags for process and progression of disease measures on the fly.

Program Steps:

Step 1: Read-in the Part B Carrier (Physician) claims.

Step 2: Generate process and progression of disease measure flags.

Step 3: Run a PROC CONTENTS and a PROC PRINT on the SAS claims file.

19. PRODUCTION JCL: <<intentionally blank>>**19.1 Catalogued Procedure:** <<intentionally blank>>

Input File: P#DSY.@AAA2049.WF17.@-----.R0009818.OUT
Output File: D#MSQ.@MSQ00M7.SAS.C006SN.Y99SNCLM

Purpose: A catalogued procedure that calls the SAS program.

19.1.1 Called Program: D#MSQ.@MSQ00M7.PGMLIB99(C006SN)

Purpose: Read in the SNF raw claims data and generate flags for process and progression of disease measures on the fly.

Program Steps:

Step 1: Read-in the SNF claims.

Step 2: Generate process and progression of disease measure flags.

Step 3: Run a PROC CONTENTS and a PROC PRINT on the SAS claims file.

20. PRODUCTION JCL: <<intentionally blank>>**20.1 Catalogued Procedure:** <<intentionally blank>>

Input File: D#MSQ.@MSQ00M7.SAS.C006IP.Y99IPCLM
Output File: D#MSQ.@MSQ00M7.SAS.C007.Y99IPSTY

Purpose: A catalogued procedure that calls the SAS program.

20.1.1 Called Program: D#MSQ.@MSQ00M7.PGMLIB99(C007)

Purpose: Create a stay-level IP file: Delete stand-alone ER claims, demonstration claims, and all overlapping claims. Identify and consolidate interim claims and transfer claims.

Program Steps:

Step 1: Identify and delete stand-alone ER, demonstration claims. Claims that meet all three of the following criteria are considered stand-alone ER claims: 1) MedPAR Discharge Destination equals '20' or MedPAR Discharge Status Code equals 'B', and 2) the sum of all MedPAR Accommodation Charges is equal to 0, and 3) the MedPAR Emergency Room Service Charge is greater than 0. Demonstration Claims are defined as claims with the 4th-6th positions of the MedPAR Provider Identification Number in the 880 to 899 range.

Step 2: Sort the file by HICNO, admission date, discharge date, and provider ID to facilitate identification of overlapping claims.

Step 3: Identify all overlapping claims. Overlapping claims are those claims where: 1) HICNOS are the same; and 2) Admission date is larger than or equal to the admission date of previous claim but smaller than the discharge date of previous claim.

Step 4: Describe the basic information on the overlapping claims.

Step 5: Merge the IP file and the overlapping claims case file by OBS. Delete overlapping claims.

Step 6: Sort the IP claims to facilitate identification of interim claims.

Step 7: Identify interim claims: if they have the same provider and the admission date of the claim is equal to, or one day after, the discharge date of the previous claim, and the status code of the previous claim is "still patient."

Step 8: Sort the IP claims by HICNO and STAYNUM.

Step 9: Collapse interim claims that belong to the same stay into a single claim. The admission date comes from the first claim in a series of interim claims and discharge date is the discharge date of the last claim in a series of interim claims. Sum payment variables. All other variable values come from the last discharge claim in a series of interim claims.

Step 10: Sort the IP claims to facilitate the identification of transfer claims.

Step 11: Identify transfer claims. Transfer claims are those claims where: 1) HICNOs are the same, and 2) PROVIDs are not the same, and 3) admission date is equal to the previous discharge date or the previous discharge date plus 1, and 4) discharge destination equals 2.

Step 12: Sort the IP claims by HICNO and STAYNUM.

Step 13: Collapse transfer claim and the claims right before it into a single record. The admission date comes from the first claim in a series of transfer claims and discharge date is the discharge date of the last claim in a series of transfer claims. Sum payment variables. Calculate new Length of Stay (LOS). All other variable values come from the last discharge claim in a series of transfer claims.

Step 14: Run a PROC CONTENTS and a PROC PRINT on the SAS IP stay file.

21. PRODUCTION JCL: <<intentionally blank>>**21.1 Catalogued Procedure:** <<intentionally blank>>

Input File: D#MSQ.@MSQ00M7.SAS.C006DM.Y99DMCLM
 D#MSQ.@MSQ00M7.SAS.A003.XREF99
Output File: D#MSQ.@MSQ00M7.SAS.C008DM.Y99DMPR

Purpose: A catalogued procedure that calls the SAS program.

21.1.1 Called Program: D#MSQ.@MSQ00M7.PGMLIB99(C008DM)

Purpose: Create a person-level summary DME file for process and progression of disease measures.

Program Steps:

Step 1: Sort the DME file.

Step 2: Merge the DME file with the cross-reference file to assign a unique HICNO to each claimant.

Step 3: Sort the DME file again by the assigned unique HICNO, and through service date.

Step 4: Special treatment for i_lipid3: need to have i_lip3_1-i_lip3_3 performed on the same date.

Step 5: Create DME person summary file with measure flags.

Step 6: Run a PROC CONTENTS and a PROC PRINT on the SAS person summary file.

22. PRODUCTION JCL: <<intentionally blank>>**22.1 Catalogued Procedure:** <<intentionally blank>>

Input File: D#MSQ.@MSQ00M7.SAS.C006HH.Y99HHCLM
 D#MSQ.@MSQ00M7.SAS.A003.XREF99
Output File: D#MSQ.@MSQ00M7.SAS.C008HH.Y99HHPR

Purpose: A catalogued procedure that calls the SAS program.

22.1.1 Called Program: D#MSQ.@MSQ00M7.PGMLIB99(C008HH)

Purpose: Create a person-level summary DME file for process and progression of disease measures.

Program Steps:

Step 1: Sort the HHA file.

Step 2: Merge the HHA file with the cross-reference file to assign a unique HICNO to each claimant.

Step 3: Sort the HHA file again by the assigned unique HICNO, and through service date.

Step 4: Create HHA person summary file with measure flags.

Step 5: Run a PROC CONTENTS and a PROC PRINT on the SAS person summary file.

23. PRODUCTION JCL: <<intentionally blank>>**23.1 Catalogued Procedure:** <<intentionally blank>>

Input File: D#MSQ.@MSQ00M7.SAS.C006IP.Y99IPCLM
 D#MSQ.@MSQ00M7.SAS.A003.XREF99
Output File: D#MSQ.@MSQ00M7.SAS.C008IP.Y99IPPR

Purpose: A catalogued procedure that calls the SAS program.

23.1.1 Called Program: D#MSQ.@MSQ00M7.PGMLIB99(C008IP)

Purpose: Create a person-level summary IP file for process and progression of disease measures.

Program Steps:

Step 1: Merge the IP file with the cross-reference file to assign a unique HICNO to each claimant.

Step 2: Sort the IP file again by the assigned unique HICNO, and through service date.

Step 3: Create IP person summary file with measure flags.

Step 4: Run a PROC CONTENTS and a PROC PRINT on the SAS person summary file.

24. PRODUCTION JCL: <<intentionally blank>>**24.1 Catalogued Procedure:** <<intentionally blank>>

Input File: D#MSQ.@MSQ00M7.SAS.C006OP.Y99OPCLM
 D#MSQ.@MSQ00M7.SAS.A003.XREF99
Output File: D#MSQ.@MSQ00M7.SAS.C008OP.Y99OPPR

Purpose: A catalogued procedure that calls the SAS program.

24.1.1 Called Program: D#MSQ.@MSQ00M7.PGMLIB99(C008OP)

Purpose: Create a person-level summary OP file for process and progression of disease measures.

Program Steps:

Step 1: Sort the OP file.

Step 2: Merge the OP file with the cross-reference file to assign a unique HICNO to each claimant.

Step 3: Sort the OP file again by the assigned unique HICNO, and through service date.

Step 4: Create OP person summary file with measure flags.

Step 5: Run a PROC CONTENTS and a PROC PRINT on the SAS person summary file.

25. PRODUCTION JCL: <<intentionally blank>>**25.1 Catalogued Procedure:** <<intentionally blank>>

Input File: D#MSQ.@MSQ00M7.SAS.C006PS.Y99PSCLM
 D#MSQ.@MSQ00M7.SAS.A003.XREF99
Output File: D#MSQ.@MSQ00M7.SAS.C008PS.Y99PSPR

Purpose: A catalogued procedure that calls the SAS program.

25.1.1 Called Program: D#MSQ.@MSQ00M7.PGMLIB99 (C008PS)

Purpose: Create a person-level summary Part B Physician file for process and progression of disease measures.

Program Steps:

Step 1: Sort the Part B Physician file.

Step 2: Merge the Part B Physician file with the cross-reference file to assign a unique HICNO to each claimant.

Step 3: Sort the Part B Physician file again by the assigned unique HICNO, and through service date.

Step 4: Special treatment for i_lipid3: need to have i_lip3_1-i_lip3_3 performed on the same date.

Step 5: Create Part B Physician person summary file with measure flags.

Step 6: Run a PROC CONTENTS and a PROC PRINT on the SAS person summary file.

26. PRODUCTION JCL: <<intentionally blank>>**26.1 Catalogued Procedure:** <<intentionally blank>>

Input File: D#MSQ.@MSQ00M7.SAS.C006SN.Y99SNCLM
 D#MSQ.@MSQ00M7.SAS.A003.XREF99
Output File: D#MSQ.@MSQ00M7.SAS.C008SN.Y99SNPR

Purpose: A catalogued procedure that calls the SAS program.

26.1.1 Called Program: D#MSQ.@MSQ00M7.PGMLIB99(C008SN)

Purpose: Create a person-level summary SNF file for process and progression of disease measures.

Program Steps:

Step 1: Sort the SNF file.

Step 2: Merge the SNF file with the cross-reference file to assign a unique HICNO to each claimant.

Step 3: Sort the SNF file again by the assigned unique HICNO, and through service date.

Step 4: Create SNF person summary file with measure flags.

Step 5: Run a PROC CONTENTS and a PROC PRINT on the SAS person summary file.

27. PRODUCTION JCL: <<intentionally blank>>**27.1 Catalogued Procedure:** <<intentionally blank>>

Input File: D#MSQ.@MSQ00M7.SAS.C008IP.Y99IPPR
 D#MSQ.@MSQ00M7.SAS.C008SN.Y99SNPR
 D#MSQ.@MSQ00M7.SAS.C008OP.Y99OPPR
 D#MSQ.@MSQ00M7.SAS.C008HH.Y99HHPR
 D#MSQ.@MSQ00M7.SAS.C008PS.Y99PSPR
 D#MSQ.@MSQ00M7.SAS.C008DM.Y99DMPR
 D#MSQ.@MSQ00M7.SAS.B005.DIAB99
 D#MSQ.@MSQ00M7.SAS.A003.XREF99
Output File: D#MSQ.@MSQ00M7.SAS.C009.Y99PRALL

Purpose: A catalogued procedure that calls the SAS program.

27.1.1 Called Program: D#MSQ.@MSQ00M7.PGMLIB99(C009)

Purpose: Create an initial person-level summary file by combining the person summary files for IP, SNF, OP, HHA, PS, and DME into a single file.

Program Steps:

Step 1: Create an initial person-level summary file by comparing the person summary files for IP, SNF, OP, HHA, PS, and DME for process and progression of disease measures.

Step 2: Read-in the flat finder file. Please note that Steps 2-5 are make-up steps of D#MSQ.@MSQ00M7.PGMLIB99(B005).

Step 3: Sort the data by XREF.

Step 4: Merge with the cross-reference file to obtain unique HICNOS.

Step 5: Merge with the person-summary file to remove extra cases that do not meet the “two non-acute face-to-face, seven days apart” criteria.

Step 6: Run a PROC CONTENTS and a PROC PRINT on the SAS person summary file.

Step 7: Perform a frequency count of each disease measure.

28. PRODUCTION JCL: <<intentionally blank>>

28.1 Catalogued Procedure: <<intentionally blank>>

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Input File:      D#MSQ.@MSQ00M7.SAS.A003.XREF99
                  D#MSQ.@MSQ0000.SAS.Y99M1002.DENOMB99
                  D#MSQ.@MSQ0000.SAS.Y98M1002.DENOMB98
                  D#MSQ.@MSQ00M7.SAS.C009.Y99PRALL
Output File:     D#MSQ.@MSQ00M7.SAS.C010.Y99PRAL2
                  D#MSQ.@MSQ00M7.SAS.C010.Y99TBL

```

Purpose: A catalogued procedure that calls the SAS program.

28.1.1 Called Program: D#MSQ.@MSQ00M7.PGMLIB99(C010)

Purpose: Identify new ESRD claimants and create a final person summary file. Run a PROC SUMMARY of this person summary file in order to generate tables.

Program Steps:

Step 1: Merge the cross-reference file with the production year denominator file in order to assign unique HICNOS. Keep only those claimants eligible for the measure.

Step 2: Sort by unique HICNO.

Step 3: Merge the cross-reference file with the denominator file for the year prior to the production year in order to assign unique HICNOS.

Step 4: Sort by unique HICNO.

Step 5: Merge the denominator files for the two years by assigned unique HICNO. Keep observations that are in the production year file.

Step 6: Merge the initial person summary file with the base denominator files in order to create a final person summary file with new ESRD and demographic information for the beneficiaries.

Step 7: Run a PROC CONTENTS and a PROC PRINT on the final SAS person summary file.

Step 8: Create the total sum of measures and sum by each demographic variable.

29. PRODUCTION JCL: <<intentionally blank>>**29.1 Catalogued Procedure:** <<intentionally blank>>

Input File: D#MSQ.@MSQ00M7.SAS.C010.Y99TBL
Output File: D#MSQ.@MSQ00M7.SAS.C011.RTFP1C99
D#MSQ.@MSQ00M7.SAS.C011.RTFP1R99
D#MSQ.@MSQ00M7.SAS.C011.RTFP2C99
D#MSQ.@MSQ00M7.SAS.C011.RTFP2R99

Purpose: A catalogued procedure that calls the SAS program.

29.1.1 Called Program: D#MSQ.@MSQ00M7.PGMLIB99(C011)

Purpose: Create tables, add descriptions, and use ODS to output the data as .RTF files.

Program Steps:

Step 1: Prepare numerators and denominators for each table.

Step 2: Create tables of count for 1) process and outcome and 2) progression of disease measures.

Step 3: Create a table of count for process and outcome of disease measures.

Step 4: Create a table of rate per 1,000 for process and outcome of disease measures.

Step 5: Create a table of count for progression of disease measures.

Step 6: Create a table of rate per 1,000 for progression of disease measures.

Step 7: Run a PROC CONTENTS and a PROC PRINT on the each of the count and rate files.

30. PRODUCTION JCL: <<intentionally blank>>

30.1 Catalogued Procedure: <<intentionally blank>>

Input File: D#MSQ.@MSQ00M7.SAS.C010.Y99TBL
 D#MSQ.@MSQ0000.SAS.Y99M1004.AGESEX99
 Output File: D#MSQ.@MSQ00M7.SAS.C012.RTFP1A99
 D#MSQ.@MSQ00M7.SAS.C012.RTFP2A99

Purpose: A catalogued procedure that calls the SAS program.

30.1.1 Called Program: D#MSQ.@MSQ00M7.PGMLIB99(C012)

Purpose: Create age/sex adjusted rate tables for age, only sex-adjusted and for sex, only age adjusted.

Program Steps:

Step 1: Create age/sex weights using the M1 1999 file D#MSQ.@MSQ0000.SAS.Y99M1004.AGESEX99. This file will also be applied to the other year in 1992-2000.

Step 2: Create adjusted rates by age/sex cells for each subgroup.

Step 3: Prepare rows (subgroups) in proper order for the tables.

Step 4: Put all the rows together for tables of 1) process and outcome, and 2) progression of disease measures.

Step 5: Create .RTF text format table of age/sex adjusted rate per 1,000 for process and outcome of disease measures.

Step 6: Create .RTF text format table of age/sex adjusted rate per 1,000 for progression of disease measures.

Step 7: Run a PROC CONTENTS on the intermediate SAS rate file.